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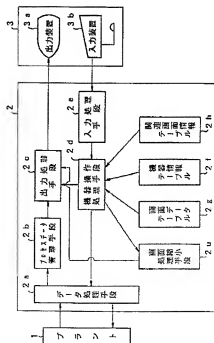
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## (54) 【発明の名称】 プラント監視装置

## (57) 【要約】

【目的】 関連画面、または付帯情報表示のための操作ステップ数を削減することを可能にする。

【構成】 プラント系統画面から機器操作を行う際には、操作の対象となる機器を選択すると、機器操作処理手段2 dが関連するグループ操作画面番号とトレンド画面番号を関連画面情報ケーブル2 hから検索し、操作対象機器の機器操作ウィンドウ番号と札かけ情報テーブル番号を機器情報テーブル2 fから検索し、グループ機器操作画面とトレンド画面と機器操作ウィンドウの画面データを表示デターとして、札かけ情報(付帯情報)と共に表示制御手段2 cに通知し、表示制御手段が表示装置3 aに機器操作ウィンドウとグループ機器操作画面とトレンド画面と札かけ情報を同時に表示するので、運転員は機能を切り替えることなく関連画面としてグループ操作画面とトレンド画面を、付帯情報をとして札かけ情報、また保守情報を参照することができる。



【特許請求の範囲】

【請求項1】 プラント系統画面、グループ機器操作画面、トレンド画面、および機器操作ウィンドウ各々の固定表示データと可変表示データからなる画面データテーブルと、

前記プラント系統画面毎に各操作機器についての機器操作ウィンドウ番号および札かけ情報テーブル番号が登録された機器情報データテーブルと、

前記プラント系統画面毎に各操作機器について関連するグループ機器操作画面およびトレンド画面の画面番号が登録されている関連画面情報テーブルと、

運転員がプラント系統画面の表示要求を要求している場合はこのプラント系統画面の表示データを前記画面データテーブルを検索することにより取出し、運転員が機器選択を要求している場合は運転員によって選択された操作機器の機器操作ウィンドウの画面データを、前記機器情報テーブルおよび画面データテーブルを検索することにより取出すとともに前記操作機器の付帯情報を前記機器情報テーブルを検索することにより取出し、更に前記操作機器の関連画面を、前記関連画面情報テーブルおよび画面データテーブルを検索することにより取出し、取出したこれらの画面情報を表示装置に応じてアイコン表示するかまたはパネル分割表示するかを決定し、パネル分割表示の場合は縮小要求を出力する機器操作処理手段と、

前記縮小要求に基づいて前記機器操作処理手段によって取出された画面情報を縮小する画面縮小処理手段と、アイコン表示の場合は前記機器操作処理手段によって取出された画面情報をそのまま前記表示装置に表示させ、パネル分割表示の場合は、前記画面縮小処理手段によって縮小された画面情報を前記表示装置に表示させる表示制御手段と、

を備えていることを特徴とするプラント監視装置。

【請求項2】 プラントのプロセスデータを、プラントの固定画面情報と合成して出力装置の画面に表示し、プラントの状態を監視しながらプラント機器を選択し、操作するプラント監視装置において、

前記プラント機器の保守情報データが格納される付帯情報格納手段と、前記保守情報を管理する保守情報管理データからなる保守情報管理テーブルを有する付帯情報管理手段と、前記機器の監視・操作を行うための情報を一括して有し、前記付帯情報管理手段の保守情報管理データを参照するためのインデックスポイントが格納されている機器情報テーブルと、

運転員からの要求に基づいて前記機器情報テーブルを参照し、前記機器に関する前記インデックスポイントを取り出し、このインデックスポイントに基づいて前記保守情報管理データを参照し、対応する保守情報データの登録及び削除を行う付帯情報設定手段と、

前記付帯情報設定手段によって前記保守情報データが更新された場合に前記プラント機器の保守情報を管理するために外部に設けられた保守情報管理システム内の保守情報データベースを更新するとともに前記保守情報管理システムからの更新要求および更新データを前記付帯情報設定手段に伝える保守情報管理手段と、

を備えていることを特徴とするプラント監視装置。

【請求項3】 プラントのプロセスデータを、プラントの固定画面情報と合成して出力装置の画面に表示し、プラントの状態を監視しながらプラント機器を選択し、操作するプラント監視装置において、

付帯情報が格納される付帯情報格納手段と、前記出力装置に表示する内容を管理する表示内容管理テーブル、操作関連情報を管理する操作情報テーブル、および必要に応じて設定される自然言語情報を管理する言語情報管理テーブルからなる付帯情報管理手段と、前記前記機器の監視・操作を行うための情報を一括して有し、前記付帯情報管理手段の各テーブルを参照するためのインデックスポイントが格納されている機器情報テーブルと、

運転員からの要求に基づいて前記機器情報テーブルを参照し、前記機器に関するインデックスポイントを取り出し、このインデックスポイントに基づいて前記付帯情報管理手段のテーブルを参照し、対応する付帯情報の編集および設定を行う付帯情報設定手段と、

を備えたことを特徴とするプラント監視装置。

【請求項4】 プラントの現場の状況を複数の撮影装置を用いて撮影し、前記撮影装置から送出される画像を画像処理手段によって処理することによって異常を検出するプラント監視装置において、

前記複数の撮影装置のうち、機器操作画面からの機器操作通知により操作される対象機器を映す撮影装置を選択し、この撮影装置の向きを変える旋回台を動かす操作手段と、

前記撮影装置の位置情報を記憶する位置情報テーブルと、

この位置情報テーブルからの位置情報を用いて操作対象である機器を映す前記撮影装置の操作指令を前記画像処理手段に伝達する操作伝達手段と、

前記プラント機器に関する情報が格納される機器情報テーブルと、

情報およびデータを表示装置に表示させる表示制御手段と、

画像処理によって異常が検知された際に、この検知結果を前記表示制御手段に通知するとともに前記機器情報テーブルに異常の発生を記録する異常検知データ処理手段と、

を備えたことを特徴とするプラント監視装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、プラントの状態を監視・操作しプラントを運転制御するプラント監視装置に関する。

#### 【0002】

【従来の技術および発明が解決しようとする課題】一般にプラント監視装置は、プラントから送出される各種プロセス量を、プラント監視装置内にあらかじめ記憶されている、プラント系統画面、グループ機器操作画面、トレンド画面等の固定画面情報と合成して画面に表示することにより、プラント状態の監視を行いながらプラント機器を選択し、操作するものである。

【0003】ここでプラント系統画面は、プラントを各系統別に分類し、グラフィック画面化し実際にプラント上で計測されているプロセスデータ、及び設置されている機器類を、グラフィック画面上に表示したものであって、各系統別にプラントの運転状況を一括監視するに用いられ、グループ機器操作画面は、機器操作ウィンドウを各系統別、ないしは、干渉系プロセスにより予めグループ化して登録し、画面に複数の機器操作ウィンドウを表示するものであって、例えば最大8機器分を同時監視、操作することができ、トレンド画面は、計測されたプロセスデータを、各計測ポイントごとにX軸を時間、Y軸をデータレンジ幅としたX-Y線図上に、時系列順に線形表示していき、各プロセスデータの時間経過による変化を監視できるようにしたものである。

【0004】なお、機器操作ウィンドウは、従来ハードスイッチにより行っていたプラント機器操作をソフトウェアによる処理により、機器操作スイッチ及び、プロセスデータ、機器運転状態等を、機器ごとにまとめ、プラント監視装置の監視画面上に表示し、プラント監視装置からの機器操作を可能とするものである。

【0005】図20に、従来のプラント監視装置の第1の例の構成を示す。図20において、データ処理手段2aは、プラント1より各種プロセス量を周期的にサンプリングし、プロセスデータ管理手段2bに通知する。又、機器操作処理手段2dからの要求により、プラント1に機器操作指令を通知する。

【0006】機器操作処理手段2dは、入力処理手段2eから送出されるデータに基づいて運転員の要求が何であるかを判断し、上記プラント系統画面、グループ機器操作画面、トレンド画面等の画面表示要求、及び、プラント機器選択要求の場合は、画面データテーブル2gより画面データを読み込み、出力処理手段2cへ通知すると同時に、出力処理手段2cへ画面の表示要求を行う。又、運転員の要求が、プラント機器操作要求の場合はデータ処理手段2aへの操作出力要求を行う。

【0007】出力処理手段2cは、機器操作処理手段2dからの、上記画面データ及び、画面出力要求により、出力装置3aに画面表示を行う。プラント機器操作時は、出力処理手段2cが、上記画面データ及び、プロセ

スデータ管理手段2bより、当該操作機器のプロセスデータを参照し、表示中の、前記プラント系統画面に選択されたプラント機器の情報を表示する。

【0008】プラント機器操作時の画面を図21に示す。図21から分かるように、プラント機器を操作する場合、表示されている、プラント系統画面210の中からプラント機器を選択し、画面上に表示された機器操作ウィンドウ211により操作を行うが、この時運転員は、上記操作対象機器の関連情報画面を同一CRT上に画面分割により表示し、関連情報を監視しながら操作していた。又、上記関連情報画面を確認するには、それぞれ個別の画面表示要求によって、運転員が必要とする情報を選択し、要求することで確認しなければならず、関連情報画面の検索・表示に時間がかかり運転員の負担となっていた。

【0009】また、従来のプラント監視装置の第2の例を図22を参照して説明する。

【0010】従来、機器の保守に関連する情報は、主として補修業務にあたる専任者により帳票19をベースとして管理されていた。すなわち、プラント監視装置2によって発見された機器の異常は帳票19に記録されるとともに、専任の補修業務従事者により入力装置16および保守情報管理手段17aを介して保守情報データベース17bに登録され、更に保守帳票16cに記録される。したがって、実際にプラントの運転に従事する運転員においては、こうした保守関連情報の伝達が適正に行われていることを常に帳票ベースで確認しておく必要があった。また、プラント監視装置2においてはこれら保守関連情報を参照することができず、プラント監視装置2内にて発見された機器の異常を即時に保守情報に反映することが出来なかったため、運転員が独自に帳票に記入し、補修業務従事者に伝達する必要があった。

【0011】また、従来のプラント監視装置の第3の例を図23を参照して説明する。

【0012】従来、機器操作に係わる機器関連周辺情報は、主として連絡ノートまたは帳票、札掛け、例えば、紙札、粘着シールの貼付、まち針などで示すなど、人手を介してプラント監視装置2以外の手段によって多くが管理されている。例外として機器操作禁止を行う場合に限り、機器操作禁止情報は、プロセスデータ管理手段2bによって管理されるプロセス情報、または機器操作処理手段2dによって管理される操作情報のいずれかまたはその両方と併せて管理されていた。この場合、機器操作禁止の操作を運転員が出力装置3から行うと、入力処理手段2eによって解釈された運転員の操作にしたがって、機器操作処理手段2dは画面データテーブル2gの書き換えにより当該機器が操作禁止の状態にあることを出力処理手段2cを介して出力装置3aに表示させる。この画面表示は、他の画面情報とともに画面データテーブル2gと併せて管理されている。さらに機器操作処理

手段 2 d は、操作禁止指定されている当該機器に対するいかなる操作もデータ処理手段 2 a を通してプラント 1 へ出力されないようにする。

【0013】このようなプラント監視装置 2 では、入出力装置 3 を用いた操作で運転員が扱える情報は、多くとも上述の機器操作の禁止を指定する情報だけであった。これ以外の関連情報については、例えば、プラント 1 の機器のいずれかが定期的な点検などのため、現場に作業員を配置し作業を行っている、安全上その機器の操作を行うことができないような場合、運転員は、届出を受けてこれを連絡用ノートまたは白板などに記載しておき、人間の手によって管理し、またプラント監視装置 2 の入出力装置 3 を用いて、前記操作禁止情報の設定を行う。しかし、この場合でもその他の関連情報、例えば、この作業の終了予定時刻などの情報は、上記の連絡用ノート、または白板などの、プラント監視装置 2 以外の記録手段で記録し、管理を行っていた。

【0014】また従来のプラント監視装置の第 4 の例を図 4 を参照して説明する。一般に発電プラントの監視、制御において、プラントの運転、状態監視を行うためのプラント監視装置、プラントの主要機器の状態監視を集音装置付き I TV カメラやマイクホンを使用し、映像と音から異常を検出し、警報を発する異常検知システムが、中央操作室に設置されている。それらのシステムを、図 2 4 に示す。プラント監視装置 2 には、C R T 入出力装置 3 を複数台設置してボラ、タービン、発電機の各系統別に、2 ～ 3 台ずつに分けて操作盤内に配置し、ハードスイッチ類に代わり C R T オペレーションによりポンプや弁などの機器類の起動、停止、開、閉の操作を行う。入力装置 3 b からの操作信号は、プラント監視装置 2 内の入力処理手段 2 e に入る。この入力処理手段 2 e からは、画面表示要求や、機器操作要求が行われる。画面表示要求では、関連画面情報テーブル 2 h、画面データテーブル 2 g を参照し機器操作処理手段 2 d によって処理され、出力処理手段 2 c へ要求を出す。機器操作要求では、機器情報テーブル 2 f を参照し、機器操作処理手段 2 d で処理され出力処理手段 2 c へ要求を出す。出力処理手段 2 c は、出力装置 3 a に画面出力を行う。

【0015】また、プラント監視装置 2 の一種である異常検知システム 9 は、現場の主要機器を監視するため、集音装置と I TV カメラ 7 を使用して、画像、音響の処理を行う。そして、画像出力装置 1 0 c に集音装置付き I TV カメラの画像を出力する。画像の処理は、異常検知システム 9 内の画像処理装置 9 a によって、色、照度の変化や差分などをとくに判定する処理を行なわれる。この処理データと音響データは、共に画像、音響処理計算機 9 b により異常状態の検知をおこない、警報を異常検知システム操作盤 1 0 内の出力装置 1 0 a に出力する。また、複数ある集音装置と I TV カメラ 7 を選択し

たり、付随機能の切り替えは、異常検知システム操作盤 1 0 内の入力装置 1 0 b により行う。

【0016】これにより、プラント監視装置を使用し、プラントの運転や、監視が一ヶ所で集中して行うことができ、機器操作も C R T に触れることで操作ができるため、操作性の向上をはかることが可能となる。また、異常監視装置では、映像や、音で監視機器の状态がその場でわかり、映像や音を記録として保存する。

【0017】従来、発電プラントにおいて、機器操作を行う際に必要となる機器関連周辺情報は、プラント監視装置内で管理されていなかった、別装置にて管理されていたりし、運転員が情報を容易に参照することができず、人手による二重管理を余儀なくされ、わずらわしさを伴うと同時に、ヒューマンエラーのおこる可能性をはらんでいた。

【0018】本発明は、これらの問題を解決するためになされたもので、第 1 の目的はプラント系統画面から機器操作を行う機能において、操作機器選択を行った際に、機器操作ウィンドウのみでなく、選択された機器に関する付帯情報、関連画面の表示も同一機能内で行うことにより、運転員に提供する情報量を増加させ、関連画面、または付帯情報表示のための操作ステップ数を削減することにある。

【0019】本発明の第 2 の目的は、プラント監視装置により、機器関連周辺情報および、保守情報を含め、機器情報を一括管理することにより機器関連周辺情報の運用上の二重管理に伴うわずらわしさをなくし、これら機器関連周辺情報を容易に参照できるようにすることにある。

【0020】更に、従来のプラント監視装置では、プラント制御監視盤と異常検知装置は別の設備であり、両方の表示を交互に監視することが難しく、視認性に問題があった。また、操作の上で個別の操作盤にて操作するため、操作の即応性、にも問題がある。

【0021】本発明の第 3 の目的は、運転操作、監視業務が相互に支障がないように行え、運転、監視の操作性、視認性を向上させ、業務負担を低減させることができるプラント監視装置を提供することにある。

【0022】

【課題を解決するための手段】第 1 の発明によるプラント監視装置は、プラント系統画面、グループ機器操作画面、トレンド画面、および機器操作ウィンドウ各々の固定表示データと可変表示データからなる画面データテーブルと、前記プラント系統画面毎に各操作機器についての機器操作ウィンドウ番号および情報テーブル番号が登録された機器情報データテーブルと、前記プラント系統画面毎に各操作機器について関連するグループ機器操作画面およびトレンド画面の画面番号が登録されている関連画面情報テーブルと、運転員がプラント系統画

面の表示要求を要求している場合はこのプラント系統画面の表示データを前記画面データテーブルを検索することにより取出し、運転員が機器選択を要求している場合は運転員によって選択された操作機器の機器操作ウィンドウの画面データを、前記機器情報テーブルおよび画面データテーブルを検索することにより取出すとともに前記操作機器の付帯情報を前記機器情報テーブルを検索することにより取出し、更に前記操作機器の関連画面を、前記関連画面情報テーブルおよび画面データテーブルを検索することにより取出し、取出したこれらの画面情報を表示装置に応じてアイコン表示するかまたはパネル分割表示するかを決定し、パネル分割表示の場合は縮小要求を出力する機器操作処理手段と、前記縮小要求に基づいて前記機器操作処理手段によって取出された画面情報を縮小する画面縮小処理手段と、アイコン表示の場合は前記機器操作処理手段によって取出された画面情報をそのまま前記表示装置に表示させ、パネル分割表示の場合は、前記画面縮小処理手段によって縮小された画面情報を前記表示装置に表示させる表示制御手段と、を備えていることを特徴とするプラント監視装置。

【0023】また、第2の発明によるプラント監視装置の第1の態様は、プラントのプロセスデータを、プラントの固定画面情報と合成して出力装置の画面に表示し、プラントの状態を監視しながらプラント機器を選択し、操作するプラント監視装置において、前記プラント機器の保守情報データが格納される付帯情報格納手段と、前記保守情報を管理する保守情報管理データからなる保守情報管理テーブルを有する付帯情報管理手段と、前記機器の監視・操作を行うための情報を一括して有し、前記付帯情報管理手段の保守情報管理データを参照するためのインデックスポイントが格納されている機器情報テーブルと、運転員からの要求に基づいて前記機器情報テーブルを参照し、前記機器に関する前記インデックスポイントを取り出し、このインデックスポイントに基づいて前記保守情報管理データを参照し、対応する保守情報データの設定登録及び削除を行う付帯情報設定手段と、前記付帯情報設定手段によって前記保守情報データが更新された場合に前記プラント機器の保守情報を管理するために外部に設けられた保守情報管理システム内の保守情報データベースを更新するとともに前記保守情報管理システムからの更新要求および更新データを前記付帯情報設定手段に伝える保守情報管理手段と、を備えていることを特徴とする。

【0024】また第2の発明によるプラント監視装置の第2の態様は、プラントのプロセスデータを、プラントの固定画面情報と合成して出力装置の画面に表示し、プラントの状態を監視しながらプラント機器を選択し、操作するプラント監視装置において、付帯情報が格納される付帯情報格納手段と、前記出力装置に表示する内容を管理する表示内容管理テーブル、操作関連情報を管理す

る操作情報テーブル、および必要に応じて設定される自然言語情報を管理する言語情報管理テーブルからなる付帯情報管理手段と、前記前記機器の監視・操作を行うための情報を一括して有し、前記付帯情報管理手段の各テーブルを参照するためのインデックスポイントが格納されている機器情報テーブルと、運転員からの要求に基づいて前記機器情報テーブルを参照し、前記機器に関するインデックスポイントを取り出し、このインデックスポイントに基づいて前記付帯情報管理手段のテーブルを参照し、対応する付帯情報の編集および設定を行う付帯情報設定手段と、を備えたことを特徴とするプラント監視装置。

【0025】また第3の発明によるプラント監視装置は、プラントの現場の状況を複数台の撮影装置を用いて撮影し、前記撮影装置から送出される画像を画像処理手段によって処理することによって異常を検出するプラント監視装置において、前記複数台の撮影装置のうち、機器操作画面からの機器操作通知により操作される対象機器を映す撮影装置を選択し、この撮影装置の向きを変え、旋回台を動かす操作手段と、前記撮影装置の位置情報を記憶する位置情報テーブルと、この位置情報テーブルからの位置情報を用いて操作対象である機器を映す前記撮影装置の操作指令を前記画像処理手段に伝達する操作伝達手段と、前記プラント機器に関する情報が格納される機器情報テーブルと、情報およびデータを表示装置に表示させる表示制御手段と、画像処理によって異常が検知された際に、この検知結果を前記表示制御手段に通知するとともに前記機器情報テーブルに異常の発生を記録する異常検知データ処理手段と、を備えたことを特徴とする。

#### 【0026】

【作用】上述のように構成された第1の発明によるプラント監視装置によれば、プラント系統画面から機器操作を行う際には、操作の対象となる機器を選択すると、機器操作処理手段が関連するグループ操作画面番号とトレンド画面番号を関連画面情報テーブルから検索し、操作対象機器の機器操作ウィンドウ番号とれかけ情報テーブル番号を機器情報テーブルから検索し、グループ機器操作画面とトレンド画面と機器操作ウィンドウの画面データを表示データとして、れかけ情報（付帯情報）と共に表示制御手段に通知し、表示制御手段が表示装置に機器操作ウィンドウとグループ機器操作画面とトレンド画面とれかけ情報を同時に表示するので、運転員は機能を切り替えることなく関連画面としてグループ操作画面とトレンド画面を、付帯情報としてれかけ情報、また保守情報を参照することができる。

【0027】また上述のように構成された第2の発明のプラント監視装置の第1の態様によれば、機器情報テーブルには、プラントにおいて本プラント監視装置を用いて運転員が操作する機器ごとに、付帯情報として保守情

報管理ケーブルをもつ付帯情報管理手段と、これらのもとに機器ごとに保守情報を格納しておく付帯情報格納手段とを順に検索するための情報を持っており、保守情報管理手段が前記付帯情報管理手段と前記付帯情報格納手段とを参照することにより、これにしたがって当該機器の保守に関連する情報を外部に表示させることができる。

【0028】さらに、運転員の要求に基づいて、付帯情報設定手段と、付帯情報管理手段と、により付帯情報格納手段の内容を変更することが可能となり、運転員が任意のときに機器の保守情報を設定し、編集することができる。また、これを保守情報管理手段を介して保守情報管理システムに伝達し、保守情報データを更新することができるようになる。これにより、従来、保守に係わる機器関連周辺情報は、主として帳票など、入手を介してプラント監視装置以外の手段によって多くが管理されていたものが、プラント監視装置によって従来から保守情報データベースに一元的に管理できるようになることによって、二重管理によるミスをふせぐとともに、わずらわしさをなくし、業務の効率向上が可能となる。

【0029】また上述のように構成された第2の発明のプラント監視装置の第2の態様によれば、機器情報テーブルには、プラントにおいて本プラント監視装置を用いて運転員が操作する機器ごとに、出力装置に表示する内容を管理する表示内容管理テーブル、機器の操作に関連する情報を管理する操作情報テーブル、及び必要に応じて設定されるそのほかの自然言語情報を管理する言語情報管理テーブルからなる付帯情報管理手段と、これらのもとに機器ごとに情報を格納しておく付帯情報格納手段とを順に検索するための情報を持っており、機器の操作が行われる度に機器操作処理手段が付帯情報管理手段と前記付帯情報格納手段とを参照することにより、これにしたがって当該機器の操作に関連する情報をもとにした当該機器の操作禁止を行ったり、また付帯情報管理手段によって管理され、付帯情報格納手段に記録されている付帯情報を外部に出力し、付帯情報内容をグラフィックとして表示装置に出力することができる。

【0030】さらに、運転員の要求に基づいて、付帯情報設定手段と、付帯情報管理手段と、により付帯情報格納手段の内容を変更することにより、機器の付帯情報を設定し、編集することができる。従来、機器操作に係わる機器関連周辺情報は、主として連絡ノートまたは帳票、札掛け、例えば、紙札、粘着シールの貼付、まち針などで示すなど、人手を介してプラント監視装置以外の手段によって多くが管理されていた付帯情報が、プラント監視装置によって、一元的に管理することによって、二重管理によるミスをふせぐとともに、わずらわしさをなくし、運転業務の効率向上が可能となる。

【0031】また上述のように構成された第3の発明のプラント監視装置によれば、機器操作を行ったとき、そ

の機器操作信号を用いて複数台設置されている撮影装置のうちの操作対象の撮影装置を判定し、判定されたその撮影装置が対象機器を移すように旋回台を動かし、映し出した影像を機器操作ウィンドウやプラント系統画面と共に同一の表示装置に出力することにより、プラント監視業務において視認性が向上すると共にプラントの運転においても、機器の操作時に動作確認が同時に行えるようになる。

【0032】また、画像処理による異常検知の結果を機器情報テーブル内に持つことによって、これにより異常を検知した場合に操作画面を切り換えて表示することも可能となる。

#### 【0033】

【実施例】第1の本発明によるプラント監視装置の一実施例の構成を図1に示す。この実施例のプラント監視装置2はデータ処理手段2aと、プロセスデータ管理手段2bと、出力処理手段2cと、機器操作処理手段2dと、入力処理手段2eと、機器情報テーブル2fと、画面データテーブル2gと、関連画面情報テーブル2hと、画面縮小処理手段2uとを備えている。

【0034】データ処理手段2aはプラント1のプロセスデータを所定の周期でサンプリングし、このプロセスデータをプロセスデータ管理手段2bに送出するとともに、機器操作処理手段2dからの要求によりプラント1に機器操作指令を通知する。プロセスデータ管理手段2bは出力処理手段2cから要求があったときデータ処理手段2aからのプロセスデータ、出力処理手段2cに送出する。出力処理手段2dはプロセスデータ管理手段2bから送出されるプロセスデータ、および機器操作処理手段2dと画面縮小処理手段2uから通知される各種表示データの画面表示処理を行い、CRT入出力装置3内の出力装置3aに表示する。

【0035】機器操作処理手段2dは画面縮小処理手段2uに、出力装置3aに表示するプラント系統画面の画面データの縮小要求を行うとともに、入力処理手段2eから通知される運転員の要求するプラント系統画面の表示データ、運転員の要求する機器の機器操作ウィンドウの表示データ、関連画面（グループ機器操作画面およびトレンド画面）の表示データ、および付帯情報（札かけ情報）のテーブル番号を検索して出力処理手段2cに通知する。

【0036】入力処理手段2eは運転員がCRT入出力装置3内の入力装置3bを介して入力される各種要求を処理して機器操作処理手段2dに通知する。機器情報テーブル2fは札かけ情報テーブル番号が登録されている。画面データテーブル2gはプラント系統画面、グループ機器操作画面、トレンド画面、および機器操作ウィンドウ等の固定表示データならびに変表示データを格納している。関連画面情報テーブル2hはプラント系統画面中に含まれる操作対象機器の関連画面としてグルー

ブ機器操作画面番号およびトレンド画面番号が登録されている。

【0037】次に第1の実施例の動作を図2を参照して説明する。なお図2は機器操作処理手段2dの処理手順を示すフローチャートである。まず、運転員によってプラント監視装置2に機器操作を行うためのプラント系統画面の表示要求が入力装置3bを介して入力処理手段2eに送られる。この表示要求にはプラント系統画面番号が含まれており、このプラント系統画面番号は入力処理手段2eによって機器操作処理手段2dに通知される（ステップF1参照）。すると、機器操作処理手段2dは入力処理手段2eから通知されたプラント系統画面番号に基づいて画面データテーブル2gを検索し、該当する画面データとして登録されている固定表示データおよび可変表示データを取出して出力処理手段2cに通知する（ステップF2、F14参照）。出力処理手段2cは、機器操作処理手段2dから通知された固定表示データを出力装置3aに表示し、さらに可変表示データをもとにプロセスデータ管理手段2bから該当するプロセスデータを取出し出力装置3aに表示する。このようにしてプラント系統画面が出力装置3aに表示される。

【0038】機器操作処理手段2dは一連の処理が終了してステップF15に達すると、図2に示すフローチャートの開始（ステップF0）に再び戻り、入力処理手段2eから送られてくる入力情報を待機する。

【0039】運転員が出力装置3aに表示されているプラント系統画面上から入力装置3bを介して操作すべき機器を選択すると、入力処理手段2eは運転員の選択した機器のX-Y座標を機器操作処理手段2dに通知する（ステップF1、F3参照）。そしてステップF7において出力装置3aが小型CRTならば、ステップF8、F9、F14に進み図3（b）に示すように機器操作ウィンドウの展開が行われ、アイコンがプラント系統画面上に表示されるように出力処理手段2cに通知がなされる。

【0040】一方、ステップF7において出力装置3aが大型CRTならばステップF10に進み、機器操作処理手段2dは入力処理手段2eから通知されたX-Y座標を、画面データテーブル2gから検索したプラント系統画面の固定表示データと照合し、運転員が選択した操作機器の機器番号を決定し、この機器番号とプラント系統画面番号に基づいて機器情報テーブル2fを検索し、出力装置3aに表示されているプラント系統画面上で選択された機器に対応した機器操作ウィンドウ番号としかけ情報テーブル番号を取出す。続いてステップF11に進み、機器操作処理手段2dはプラント系統画面番号と機器番号に基づいて関連画面情報テーブル2hを検索し、登録されているグループ機器操作番号とトレンド画面番号を取出す。そして、ステップF12に進み、グループ機器操作画面番号、トレンド画面番号、および機器

操作ウィンドウ番号に基づいて画面データテーブルを検索し、固定表示データと可変表示データを取出す。

【0041】続いて機器操作処理手段2dは画面縮小処理手段2uにプラント系統画面番号を通知するとともに画面の縮小要求を行う（ステップF13参照）。すると画面縮小処理手段2uはプラント系統画面番号に基づいて、画面データテーブル2gを検索した後、画面データを取り出し、縮小処理を行い、機器操作処理手段2dを介して出力処理手段2cに通知する（ステップF14参照）。出力処理手段2cは縮小処理された画面データを表示データとして出力装置3aに表示する。このとき、出力装置3aは上述したように大型CRTであるので、画面データは図4に示すようにパネル分割表示される。すなわち、プラント系統画面、グループ機器操作画面、トレンド画面、機器操作ウィンドウ、およびしかけ情報は出力装置3aの各々の表示エリアに表示される。

【0042】なお、図2に示す機器選択ステップF3において、入力処理手段2eから送出される入力情報が機器選択に関する情報でないならばステップF4に進み、入力情報がアイコン操作要求であるかどうか判別され、アイコン操作要求でないならば処理を終了し、アイコン操作要求である場合はステップF5に進み、機器情報テーブル2f、画面データテーブル2g、および関連画面情報テーブル2hから必要な情報を取出し、アイコン情報の開閉要求を出力処理手段2cに通知する（図2ステップF6、F14、図3（c）参照）。なお、機器情報テーブル2fには図5に示すように各プラント系統画面毎に機器番号、機器操作ウィンドウ番号、付帯情報テーブルポインタ等が各々記録されており、画面データテーブル2gには図6に示すように、プラント系統画面毎に、プラント系統画面、グループ機器操作画面、トレンド画面、および機器操作の各々の固定表示データおよび可変表示データが記録されており、関連画面情報テーブル2hにはプラント系統画面毎に、機器番号、グループ機器操作画面、トレンド画面等が記録されている。

【0043】以上説明したように本実施例によれば、運転員の操作機器選択要求時、出力装置3aの画面上に表示されているプラント系統画面を表示を縮小表示し、出力装置3aの画面表示空きエリアへ、関連情報画面、及び、付帯情報を自動表示し、関連情報を参照しながらプラント機器を操作する機能を有し、これら機能を出力装置3aの表示性能によりアイコン表示とすると、パネル分割表示とすることを切り換えて実施することにより、画面縮小時、出力装置の画面表示解像度の低下により、運転員に与える表示の見にくさを、抑えた状態でプラント機器操作を可能となるとともにまた操作機器選択を行った際に、機器操作ウィンドウのみでなく、選択された機器に関する付帯情報、関連画面の表示も同一機能内で行うことができ、運転員に提供する情報量を増加させ、関連画面、または付帯情報表示のための操作ステップ数

を削減することができる。

【0044】次に第2の発明によるプラント監視装置の第1の実施例の構成を図8に示す。この実施例のプラント監視装置2は図2に示す従来のプラント監視装置2において、機器情報テーブル2f、付属情報設定手段2において、付属情報管理手段2m、付属情報格納手段2n、保守情報データ入出力処理手段2w、および保守情報管理手段2xを新たに設けたものである。なお、付属情報管理手段2mには保守情報管理テーブル2yが含まれており、付属情報格納手段2nには保守情報データ2oが含まれている。また、補修業務専任者の管理下にある保守情報管理システム17には保守情報データ入出力処理手段17cと保守情報データベース更新手段17dが新たに設けられている。

【0045】この実施例では、プラント機器に係わる情報についてはすべて付属情報管理手段2mによって管理されている。機器情報テーブル2fは、当該機器の監視及び操作に必要な情報の全てについて、保守情報管理テーブル2yを参照するポイントをデータとして有している。付属情報格納手段2n内にある保守情報データ2oについても当該機器の保守情報の格納場所を示すインデックスポイントが機器ごとに保守情報管理テーブル2yに格納されている。

【0046】なお、保守情報管理手段2xによって付属情報格納手段2nに記録されている保守情報データ2oを参照する場合についても、また付属情報設定手段21によって付属情報格納手段2nに記録されている保守情報データ2oを編集または登録する場合についても、機器情報テーブル2fに格納されているインデックスポイントを参照して行う。

【0047】付属情報管理手段2mを構成する保守情報管理テーブル2yは、付属情報格納手段2n内の保守情報データ2oの参照箇所を示すポイントと、そのデータ長を機器ごとに持つ。すなわち、実際の保守情報の内容そのものは保守情報管理テーブル2y、付属情報格納手段2nから参照される。

【0048】図9は、これらのテーブル構成の関係を示したものであり、図10は、保守情報管理手段2xによって付属情報格納手段2nに記録されている保守情報データを2oを参照する場合の過程を示すフローチャートである。

【0049】例えば、プラント監視装置2において、保守情報を参照するためには、付属情報格納手段2nのメモリのロケーションから、機器の保守に関する情報を保守情報管理テーブル2yによって示されるロケーションを参照してこの機器の保守情報データを参照し、出力処理手段2cに渡してこれを出力装置3の出力装置(CRT)3aに表示する。

【0050】この場合、はじめに保守情報管理手段2xから機器操作処理手段2dに要求がなされ(図10のオ

ップF21参照)、この機器操作処理手段2dによって、機器情報テーブル2fが参照される(ステップF22参照)。ここで図9に示す付属情報管理用ポイント4を取得して、目的とする保守情報管理テーブル2yの先頭アドレスを取得してから(ステップF23参照)、ポイント4にしたがってインデックスしたアドレスを参照する。これによって目的とする機器の操作情報が記録されている付属情報格納手段2nのアドレスと操作情報のデータ長を取得し、(ステップF24参照)、この箇所を参照して保守情報データ2oの取得を行う(ステップF25参照)。これをもとに保守情報を表示(ステップF26参照)することになる。

【0051】一方、付属情報設定手段21によって付属情報格納手段2nに記録されている保守情報を編集または登録する場合については、機器情報テーブル2fのインデックスにより、付属情報管理手段2mの保守情報管理テーブル2yに記録されているアドレス及びデータ長を保守情報管理テーブル2yにおいて更新することにより付属情報格納手段2nを更新する。

【0052】このときの手續を図11のフローチャートに示す。例えば、運転員による入力装置3bからの保守情報設定要求操作により、入力処理手段2eで設定要求操作が解釈されると、この機器の識別番号(機器番号)と、要求内容が含まれたデータが付属情報設定手段21に渡される(ステップF31参照)。次に機器番号に基づいて機器情報テーブル2fから付属情報管理用ポイント4を取得し(ステップF32参照)、これと書き込み要求から取り出した保守情報を格納する場所を管理する保守情報管理テーブル2yの先頭アドレスを参照して(ステップF33参照)、保守情報管理テーブル2yの該当機器の保守情報データを取得する。すなわち、ここで、新しい保守情報データのデータ長を参照して、これに見合う空きエリアをメモリエリア、すなわち付属情報格納手段2nに確保できるようなら、その先頭アドレスとデータ長を保守情報管理テーブル2yのデータとして更新し(ステップF34、F35)、さらに、確保できたエリアに保守情報データを更新する(ステップF36参照)。確保できなければ、エラーを返す(ステップF37参照)。

【0053】データを削除する場合には、前述した付属情報の設定の場合と同様に、機器情報テーブル2fより削除要求された機器の機器番号を参照し、保守情報管理テーブル2y内の当該機器開始アドレス、及びデータ長を、付属情報格納手段2nをスキャンするプログラム内で予め付属情報無し(不定)と判断されるように規定された数値に、上記開始アドレス、及び上記データ長を書き替えることにより、保守情報データ2oが削除されたものとする。

【0054】一方、保守情報管理システム17内の保守情報データベース17bはプラント監視装置に必要とさ



れる以外の管理情報を含むためプラント監視装置2内におかない。補修業務専任者の管理下にある保守情報管理用システム17を構成にもち、この中に管理されるものとする。したがって、プラント監視装置2と保守情報管理用システム17との間の不整合をおこさないようにするため、どちらの側においても変更が生じた場合には、自動的にお互いのデータを更新する仕組みを持つ。これは保守情報管理手段2xまたは保守情報管理手段17aにより行われる。図12に示すように変更が生じたことを判定すると(ステップF41参照)、保守情報管理手段2xまたは保守情報管理手段17aは、保守情報を取り出し(ステップF42参照)、保守情報データ入出力処理手段2wあるいは17cにこれを通知し(ステップF43参照)、各々の保守情報データを参照して、保守情報データ伝送手段18を介してそれぞれ他方に伝送する(ステップF44参照)。

【0055】保守情報管理用システム17側でこれを受け取ると、保守情報データ入出力処理17dへの更新要求は、保守情報データベース更新手段17dにより実行される。

【0056】またプラント監視装置2側では、保守情報の更新要求を受けとこれを付帯情報設定手段21に通知し、これにより保守情報データ2oを更新する(ステップF46、F47、F48参照)。

【0057】以上説明したように本実施例によれば、従来プラント運転日誌、作業連絡表等により、プラント監視装置2とは独立して補修業務として作成・管理していた、保守情報管理システム17の保守情報データベースを参照、管理できるようにしたことにより、機器操作を行う際に必要となる機器保守情報を運転員が容易に参照することが可能となり、さらにこの保守情報があることを運転員に出力装置を通じて通知または表示し、また必要に応じて保守情報を設定登録、または削除し、従来保守連絡用紙等をもって行っていた業務をオンラインで作成し、登録できるように機器関連周辺情報および、保守情報を含め、機器情報を一括管理することにより機器関連周辺情報の運用上の二重管理に伴うわずらわしさがなくなり、これら機器関連周辺情報を容易に参照することができる。

【0058】次に第2の発明によるプラント監視装置の第2の実施例の構成を図13に示す。この実施例のプラント監視装置2は図23に示す従来のプラント監視装置において、機器情報テーブル2fと、付帯情報設定手段21と、付帯情報管理手段と、付帯情報格納手段2nを新たに設けたものである。そして、付帯情報管理手段2mには、表示色テーブル2g、表示形状管理テーブル2i、操作情報テーブル2j、および表示文字管理テーブル2pが含まれている。

【0059】この実施例では、プラント機器に係わる情報についてはすべて機器情報テーブル2fによって管理

されている。機器情報テーブル2fは、当該機器の監視及び操作に必要となる情報の全てについて、その情報テーブルを参照するポイントをデータとしてもつが、付帯情報管理手段2mについても、これを構成する、表示文字管理テーブル2p、表示色テーブル2g、表示形状管理テーブル2i、操作情報テーブル2j、及び言語情報管理テーブル2kの全てに共通してもちいることのできる、当該機器の管理用情報の格納場所を示すインデックスポイントが機器ごとに格納されている。

【0060】機器操作処理手段2dによって付帯情報格納手段2nに記録されている付帯情報を参照する場合についても、また付帯情報設定手段21によって付帯情報格納手段2nに記録されている付帯情報を編集または登録する場合についても、機器情報テーブル2fに格納されているインデックスポイントを参照して行う。

【0061】付帯情報管理手段2mを構成する表示文字管理テーブル2p、表示色テーブル2g、表示形状管理テーブル2i、操作情報テーブル2j、及び言語情報管理テーブル2kのそれぞれは、付帯情報として表示する文字の内容と、グラフィックの色及び形状、機器の操作に関連する情報、周辺情報としての言語情報を格納する付帯情報格納手段2nの参照箇所を示すポイントと、そのデータ長を機器ごとに持つ。すなわち、実際の付帯情報の内容そのものは表示文字管理テーブル2p、表示色テーブル2g、表示形状管理テーブル2i、操作情報テーブル2j、及び言語情報管理テーブル2kのそれぞれのテーブルのポイントとデータ長によって付帯情報格納手段2nから参照される。これらのテーブル構成の関係を図14に示す。

【0062】機器操作処理手段2dによって付帯情報格納手段2nに記録されている付帯情報を参照する場合について、その過程を図15のフローチャートに示す。例えば、プラント監視装置の一機能である、機器操作ウィンドウへの札掛け機能、すなわち機器の故障などによってこの機器の操作を一時的に禁止したいときなどに行うために、この旨を明示する札の表示を機器操作ウィンドウに行う機能によって、当該機器への操作を実現するためには、付帯情報格納手段2nとして用意しているメモリのロケーションから、この機器の操作に関連する情報を操作情報テーブル2jによって示されるロケーションを参照してこの機器が操作を禁止されているかどうか、のデータを参照して、当該機器に対する運転員のCRT入出力装置3からの操作を受け付けるかどうかを判定しなければならぬ。

【0063】この場合、はじめに機器操作処理手段2dによって、機器情報テーブル2fが参照される(ステップF51参照)。ここで図14に示される付帯情報管理用ポイント4を取得して、目的とする操作情報テーブル2jの先頭アドレスを取得してから(ステップF52参照)、付帯情報管理用ポイントにたがってインデック

したアドレスを参照する。これによって目的とする機器の操作情報が記録されている付帯情報格納手段 2 n のアドレスと操作情報のデータ長を取得し（ステップ F 5 3 参照）、この箇所を参照して付帯情報データの取得を行う（ステップ F 5 4 参照）。これをともに機器操作が可能かどうかを判定（ステップ F 5 5 参照）することになる。

【0064】この他にも、札掛け機能などで用いる、表示文字の任意設定機能、すなわち、札がかかっている際の札の表示文字の内容を運転員が任意に設定できる機能の場合なども、同様に、表示文字管理テーブル 2 p を機器情報テーブル 2 f から参照して、表示文字などのデータが格納されているロケーションをアクセスできる。

【0065】一方、付帯情報設定手段 2 l によって付帯情報格納手段 2 n に記録されている付帯情報を編集または登録する場合については、機器情報テーブル 2 f のインデックスにより、付帯情報管理手段 2 m を構成する表示文字管理テーブル 2 p、表示色テーブル 2 q、表示形状管理テーブル 2 i、操作情報テーブル 2 j、及び言語情報管理テーブル 2 k のそれぞれをアクセスし、変更内容のデータをもとに、変更を行う項目のデータ長をあらたに表示文字管理テーブル 2 p、表示色テーブル 2 q、表示形状管理テーブル 2 i、操作情報テーブル 2 j、及び言語情報管理テーブル 2 k のそれぞれに更新し、付帯情報格納手段 2 n を更新する。このときの手続を図 16 のフローチャートに示す。

【0066】例えば、前記札掛け機能の中でのメモ機能、すなわち、従来の連絡ノートなどの代わりに一定字数のメモを札掛けを行う際に機器ごとに記録しておく機能を実現する場合、運転員による入力装置 3 b からのメモ設定要求操作により、入力処理手段 2 e でメモ設定要求操作が解釈されると、この機器の識別番号と、要求内容、この場合はメモ文データとメモ文の書き込み要求とが含まれたデータが付帯情報設定手段 2 l に渡される（ステップ F 6 1 参照）。次に機器番号によって機器情報テーブル 2 f から付帯情報管理用ポインティング 4 を取得し（ステップ F 6 2 参照）、これとメモ文の書き込み要求から取り出したメモ文を格納する場所を管理する言語情報管理テーブル 2 k の先頭アドレスとを参照して（ステップ F 6 3 参照）、言語情報管理テーブル 2 k の該当機器の管理情報データを取得する。すなわち、ここで、新しいメモ文のデータ長を参照して、これに見合う空きエリアをメモリアリヤ、すなわち付帯情報格納手段 2 n に確保できるように、その先頭アドレスとデータ長を言語情報管理テーブル 2 k のデータとして更新し（ステップ F 6 4、F 6 5 参照）、さらに、確保できたエリアにメモ文のデータを更新する（ステップ F 6 6 参照）。確保ができなければ、エラーを返す（ステップ F 6 7）。

【0067】このようにして、他の場合の可変長データ、例えば表示札の形状なども更新、編集を可能とす

る。又、各機器に設定された付帯情報を削除する場合には、前述した付帯情報の設定方法と同様に、機器情報テーブル 2 f より削除要求された機器のインデックスを参照し、表示文字管理テーブル 2 p 内の当該機器開始アドレス、及びデータ長を、付帯情報格納手段 2 n をスキャンするプログラム内で予め付帯情報無し（不定）と判断されるように規定された数値に、開始アドレス、及びデータ長を書き替えることにより、機器の付帯情報が削除されたものとする。

【0068】図 17 に、本実施例で付帯情報として扱い、付帯情報格納手段 2 n に収録されているものをあげ、付帯情報格納手段 2 n 内でのテーブル構成を挙げる。

【0069】以上説明したように本実施例によれば、必要に応じて設定されるそのほかの自然言語情報を管理する言語情報管理テーブルとからなる付帯情報管理手段と、これら付帯情報のデータを実際に格納しておく付帯情報格納手段と、前記付帯情報の設定登録及び削除を運転員がプラント監視装置より、任意に行う際に前記付帯情報管理手段及び付帯情報格納手段を編集することを可能とする付帯情報設定手段とを付加し、従来プラント運転日誌、作業連絡表等により、運転員が作成・管理していた、機器状態を示す付帯情報（機器関連周辺情報）を一元管理することにより、機器操作を行う際に必要となる機器関連周辺情報を運転員が容易に認知または参照することを可能とすることができる。

【0070】さらにこの付帯情報があることを運転員に出力装置を通じて通知または表示し、また必要に応じて付帯情報を設定登録、または削除することにより、機器関連周辺情報および、保守情報を含め、機器情報を一括管理することで機器関連周辺情報の運用上の二重管理に伴わずらわしさがなくなり、これら機器関連周辺情報を容易に参照することができる。

【0071】次に第 3 の発明によるプラント監視装置の一実施例の構成を図 18 に示す。この実施例のプラント監視装置 2 は、図 24 に示す従来のプラント監視装置において、カメラ操作判定手段 2 r と、カメラ位置情報テーブル 2 s と、カメラ操作伝達手段 2 t と、異常検知データ処理手段 2 v とを新たに設けたものである。

【0072】この実施例では、プラントの監視、操作にともない現場の機器の監視のための集音装置付き 1 TV カメラ 7 の位置情報を記憶するためのカメラ位置情報テーブル 2 s を設け、複数台設置された各集音装置付き 1 TV カメラ 7 が監視する機器に対する位置情報を記憶する。オペレータが CRT 入出力装置 3 の入力装置 3 b から系統画面内の機器選択や、機器操作画面からの機器操作の要求を行い、画面処理データや、操作される機器の情報の処理を入力処理手段 2 e に通知する。入力処理手段 2 e からは、画面変更や機器操作が機器操作処理手段 2 d に通知され、機器情報テーブル 2 f、画面データ

ープル2g、関連画面情報テーブル2hの各情報を参照して処理を行う。

【0073】そして処理された機器のデータは、機器情報テーブル2f、画面データテーブル2g等の情報を書き換える。監視機器に対するカメラの判定や操作の通知のため、機器情報テーブル2fとカメラ位置情報テーブル2sとを参照して、カメラ操作判定手段2rにてカメラの判定と位置情報の選別処理が行われる。このカメラ判別処理と、位置情報の選別結果は、カメラ操作伝達手段2tに通知される。そして、このカメラ操作伝達手段2tから異常検知システム9の画像・音響処理計算機9bへ要求が送られる。画像・音響処理計算機9bでは、操作機器に対応する集音装置付きITVカメラ7に切り替える処理と、旋回台8を動作させるための要求処理を行い、旋回台8へ動作要求を行う。

【0074】操作機器対象の集音装置付きITVカメラ7からの映像は、異常検知システム9内の画像処理装置9aへ送られ、処理がなされた後画像・音響処理計算機9bにて、異常検知のための処理が集音装置からの音片と共に行われる。監視映像と、処理画像は、異常検知データ処理手段2vを介して出力処理手段2cへ送られる。異常検知データ処理手段2vでは機器情報テーブル2fに当該操作機器の検知結果を返す。また画像イメージータなどは出力処理手段2cへそのまま渡す。このほか出力処理手段2cへは、機器操作処理手段2dにて処理された画面データや機器操作の情報、プラント1よりでたプロセス値を保存しているプロセスデータ管理手段2bからのデータが送られ、CRT入出力装置3の出力装置3aへ表示を行う。

【0075】異常検知システム9の各機能は、CRT入出力装置3の入力装置3bより操作することができる。操作画面と、その操作機器の現場映像の出力された表示装置を図19に示す。図19において11はCRT表示画面、12は機器操作ウィンドウ、13はITVカメラ映像画面、14は異常検知システム表示画面を示す。

【0076】以上の実施例により、本発明では、プラント監視装置2のCRT入出力装置3に機器操作ウィンドウ、プラント系統画面と共に監視、操作機器の映像を表示することが可能となり、入力装置3bからの機器操作要求によりその操作機器を映す集音装置付きITVカメラ7を切り替えて、その監視映像を出力装置3aに出力することができるようになる。

【0077】以上説明したように本実施例によれば、プラント制御監視盤上で異常検知装置による検知の結果を容易に参照でき、両方の表示を同時に監視することができる。また、操作の上でも同一の操作盤にて操作するため、操作の即応性、にも相互に支障がないように行え、運転、監視の操作性、視認性を向上させ、業務負担を低減させることができる。

【0078】

【発明の効果】以上述べたように、第1の発明によれば操作機器選択を行った際に、機器操作ウィンドウのみでなく、選択された機器に関する付帯情報、関連画面の表示も同一機能で行うことにより、運転員に提供する情報量を増加させ、関連画面、または付帯情報表示のための操作ステップ数を削減することができる。

【0079】また第2の発明によれば、プラント監視装置により、機器関連周辺情報および、保守情報を含め、機器情報を一括管理することにより機器関連周辺情報の運用上の二重管理に伴うわずらわしさをなくし、これら機器関連周辺情報を容易に参照することができる。

【0080】また第3の発明によれば、運転操作、監視業務が相互に支障がないように行え、運転、監視の操作性、視認性を向上させ、業務負担を低減させることができる。

【図面の簡単な説明】

【図1】第1の発明の実施例の構成を示すブロック図。

【図2】第1の発明の実施例にかかる機器操作処理手段の機能を説明するフローチャート。

【図3】第1の発明の実施例の画面表示例を示す模式図。

【図4】第1の発明の実施例の画面表示例を示す模式図。

【図5】第1の発明の実施例にかかる機器情報テーブルの構成を示す模式図。

【図6】第1の発明の実施例にかかる画面データテーブルの構成を示す模式図。

【図7】第1の発明の実施例にかかる関連画面情報テーブルの構成を示す模式図。

【図8】第2の発明によるプラント監視装置の第1の実施例の構成を示すブロック図。

【図9】第2の発明の第1の実施例にかかるテーブルの構成の関係を説明する説明図。

【図10】第2の発明の第1の実施例にかかるデータ参照手続処理の処理手順を示すフローチャート。

【図11】第2の発明の第1の実施例にかかるデータ更新・変更手続処理の処理手順を示すフローチャート。

【図12】第2の発明の第1の実施例にかかる保守情報更新処理の処理手順を示すフローチャート。

【図13】第2の発明の第2の実施例の構成を示すブロック図。

【図14】第2の発明の第2の実施例にかかるテーブルの構成の関係を説明する説明図。

【図15】第2の発明の第2の実施例にかかるデータ参照手続処理の処理手順を示すフローチャート。

【図16】第2の発明の第2の実施例にかかるデータ更新・変更手続の処理手順を示すフローチャート。

【図17】第2の発明の第2の実施例にかかるデータの構成を説明する説明図。

【図18】第3の発明の一実施例の構成を示すブロック

図。

【図 19】第 3 の発明の実施例に用いられる出力装置の表示画面を示す模式図。

【図 20】従来のプラント監視装置の構成を示すブロック図。

【図 21】従来のプラント監視装置に用いられる画面表示の例を説明する模式図。

【図 22】従来のプラント監視装置の他の例の構成を示すブロック図。

【図 23】従来のプラント監視装置の他の例の構成を示すブロック図。

【図 24】従来のプラント監視装置の他の例の構成を示すブロック図。

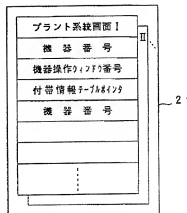
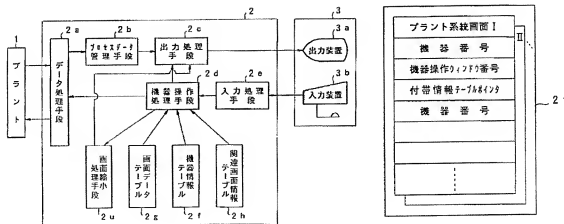
【符号の説明】

- 1 プラント
- 2 プラント監視装置
- 2 a データ処理手段
- 2 b プロセスデータ管理手段
- 2 c 出力処理手段
- 2 d 機器操作処理手段
- 2 e 入力処理手段
- 2 f 機器情報テーブル
- 2 g 画面情報テーブル
- 2 h 関連画面情報テーブル
- 2 i 表示形状管理テーブル
- 2 j 操作情報テーブル
- 2 k 言語情報管理テーブル
- 2 l 付帯情報設定手段

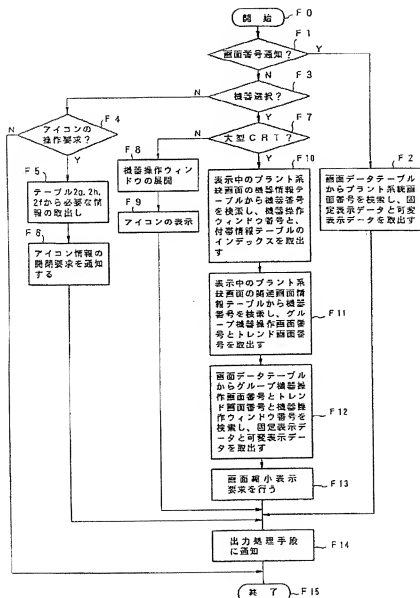
- 2 m 付帯情報管理手段
- 2 n 付帯情報格納手段
- 2 o 保守情報データ
- 2 p 表示文字管理テーブル
- 2 r カメラ操作判定手段
- 2 s カメラ位置情報テーブル
- 2 t カメラ操作伝達手段
- 2 u 画面縮小処理手段
- 2 v 異常検知データ処理手段
- 2 w 保守情報データ入出力処理手段
- 2 x 保守情報管理手段
- 2 y 保守情報管理テーブル
- 3 C R T 入出力装置
- 3 a 出力装置
- 3 b 入力装置
- 4 付帯情報管理用ポインタ
- 11 C R T 表示画面
- 12 機器操作ウィンドウ
- 16 保守情報管理用システム入出力装置
- 16 a 保守情報管理用システム出力装置
- 16 b 保守情報管理用システム入力装置
- 16 c 保守情報管理用システム根拠出力装置
- 17 保守情報管理用システム
- 17 a 保守情報管理用手段
- 17 b 保守情報データベース
- 17 c 保守情報データ入出力処理手段
- 17 d 保守情報データベース更新手段
- 18 保守情報データ伝達手段

【図 1】

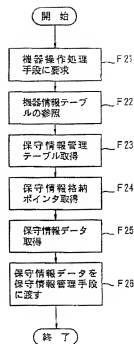
【図 5】



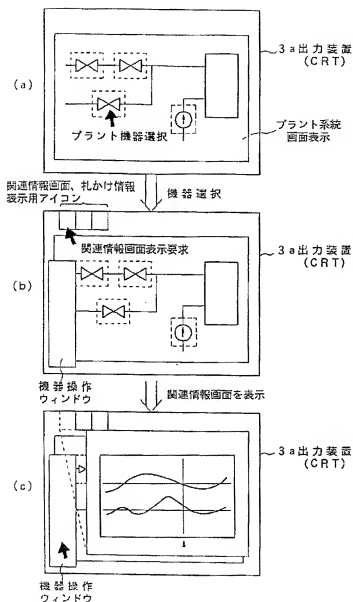
【図2】



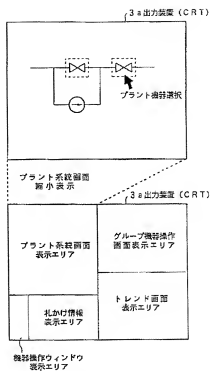
【図10】



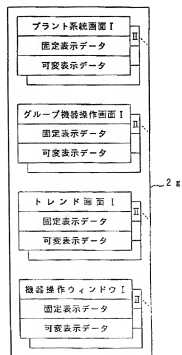
【図3】



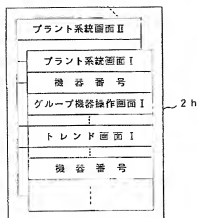
【図4】



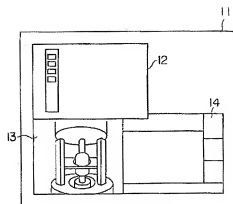
【図6】



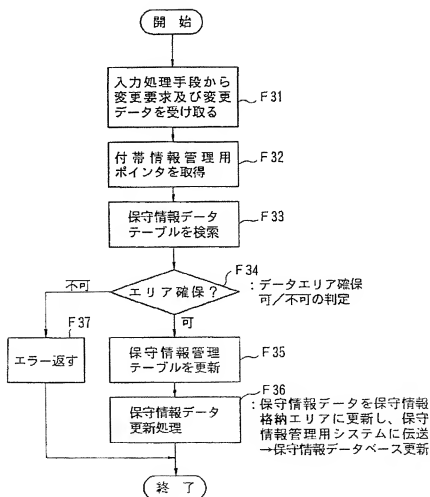
【図7】



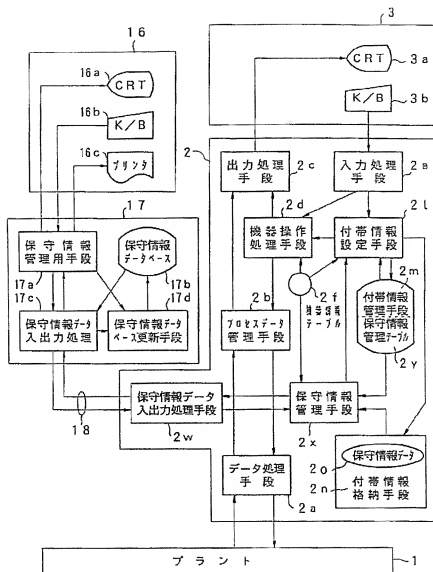
【図19】



【図11】

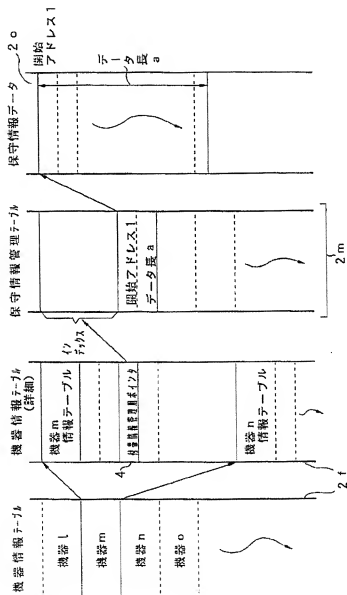


【図8】

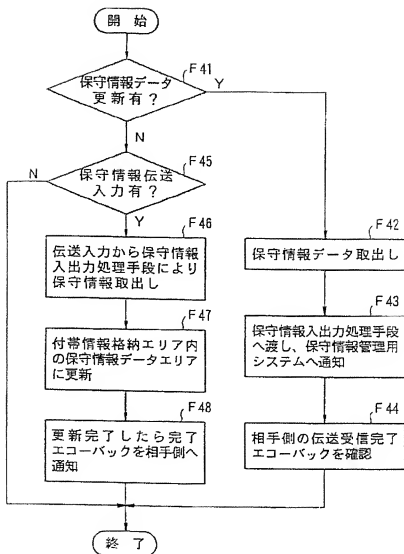




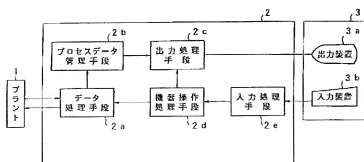
【図9】



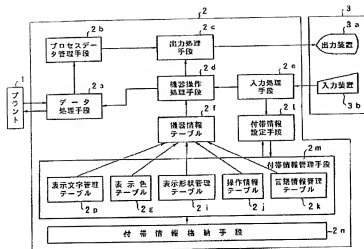
【図 12】



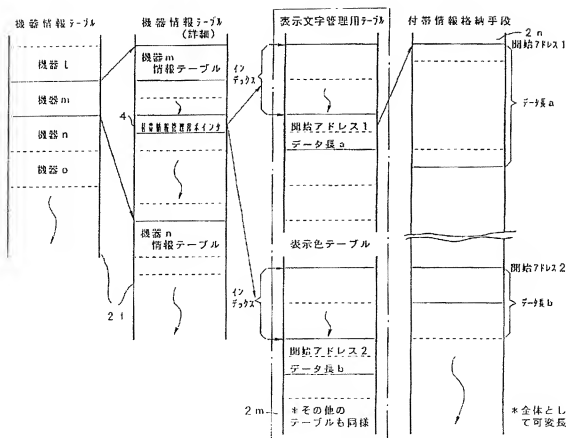
【図 23】



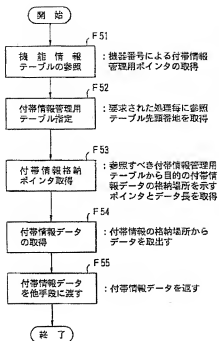
【図13】



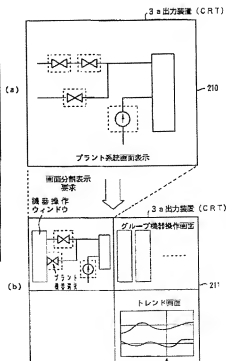
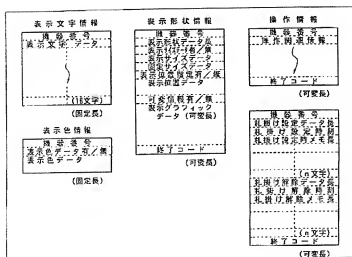
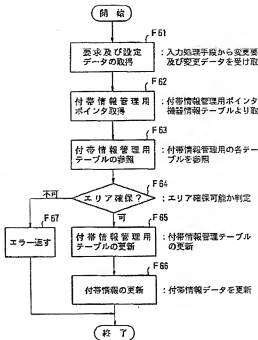
【図14】



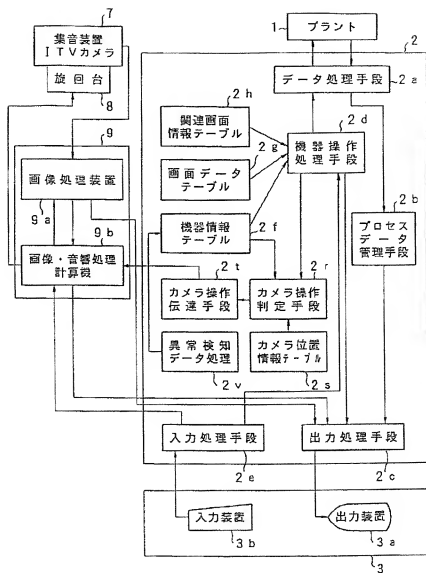
【图 16】



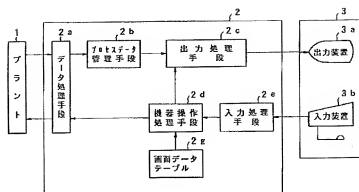
【§ 21】



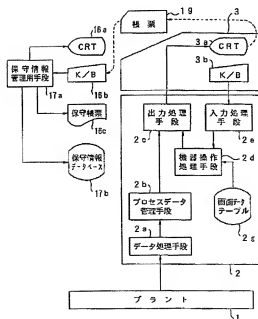
【図18】



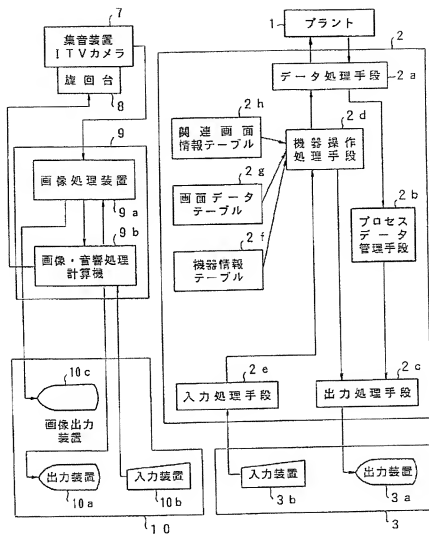
【図20】



【図22】



【図24】



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EFFECT OF THE INVENTION

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[Effect of the Invention] As stated above, when actuation device selection is performed according to the 1st invention, by performing not only a device actuation window but the display of the incidental information about the selected device, and a related screen by the same function, the amount of information with which an operating staff is provided is made to increase, and the actuation number of steps for a related screen or an incidental information display can be reduced.

[0079] Moreover, including device related circumference information and maintenance information, by carrying out package management of the device information, the troublesomeness accompanying the duplex management on employment of device related circumference information can be lost, and, according to the 2nd invention, these devices related circumference information can be easily referred to with plant supervisory equipment.

[0080] Moreover, according to the 3rd invention, it can carry out so that there may not be operation and monitor operation mutually about trouble, and the operability of operation and a monitor and visibility can be raised, and an operation burden can be reduced.

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[Translation done.]



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## DESCRIPTION OF DRAWINGS

## [Brief Description of the Drawings]

- [Drawing 1] The block diagram showing the 1st configuration of the example of invention.
- [Drawing 2] The flow chart explaining the function of the device actuation processing means concerning the example of the 1st invention.
- [Drawing 3] The mimetic diagram showing the example of a screen display of the example of the 1st invention.
- [Drawing 4] The mimetic diagram showing the configuration of the device information table concerning the example of the 1st invention.
- [Drawing 5] The mimetic diagram showing the configuration of the screen data table concerning the example of the 1st invention.
- [Drawing 6] The mimetic diagram showing the configuration of the screen data table concerning the example of the 1st invention.
- [Drawing 7] The mimetic diagram showing the configuration of the related screen information table concerning the example of the 1st invention.
- [Drawing 8] The block diagram showing the configuration of the 1st example of the plant supervisory equipment by the 2nd invention.
- [Drawing 9] The explanatory view explaining the relation of the configuration of the table concerning the 1st example of the 2nd invention.
- [Drawing 10] The flow chart which shows the procedure of the data reference procedure processing concerning the 1st example of the 2nd invention.
- [Drawing 11] The flow chart which shows the procedure of renewal of data / modification procedure processing concerning the 1st example of the 2nd invention.
- [Drawing 12] The flow chart which shows the procedure of the maintenance information update process concerning the 1st example of the 2nd invention.
- [Drawing 13] The block diagram showing the 2nd configuration of the 2nd example of invention.
- [Drawing 14] The explanatory view explaining the relation of the configuration of the table concerning the 2nd example of the 2nd invention.
- [Drawing 15] The flow chart which shows the procedure of the data reference procedure processing concerning the 2nd example of the 2nd invention.
- [Drawing 16] The flow chart which shows the procedure of renewal of data / modification procedure concerning the 2nd example of the 2nd invention.
- [Drawing 17] The explanatory view explaining the configuration of the data concerning the 2nd example of the 2nd invention.
- [Drawing 18] The block diagram showing the 3rd configuration of one example of invention.
- [Drawing 19] The mimetic diagram showing the display screen of the output unit used for the example of the 3rd invention.
- [Drawing 20] The block diagram showing the configuration of conventional plant supervisory equipment.
- [Drawing 21] The mimetic diagram explaining the example of the screen display used for conventional plant supervisory equipment.
- [Drawing 22] The block diagram showing the configuration of other examples of conventional plant supervisory equipment.
- [Drawing 23] The block diagram showing the configuration of other examples of conventional plant supervisory equipment.
- [Drawing 24] The block diagram showing the configuration of other examples of conventional plant supervisory equipment.

## [Description of Notations]

- 1 Plant
- 2 Plant Supervisory Equipment
  - 2a Data-processing means
  - 2b Process-data management tool
  - 2c Output-processing means
  - 2d Device actuation processing means
  - 2e Input-process means
  - 2f Device information table
  - 2g Screen information table
  - 2h Related screen information table
  - 2i Display configuration managed table
  - 2j Actuation information table
  - 2k Language information management table
  - 2l Incidental information setting-out means
  - 2m Incidental information management means
  - 2n Incidental information storing means
  - 2o Maintenance information data
  - 2p Graphic-character managed table
  - 2r Camera actuation Judging means
  - 2s Camera positional information table
  - 2t Camera actuation means of communication
  - 2u Screen cutback processing means
  - 2v Abnormality detection data-processing means
  - 2w Maintenance information data radial transfer means
  - 2x Maintenance information management means
  - 2y Maintenance information management table
- 3 CRT I/O Device
  - 3a Output unit
  - 3b Input unit
- 4 Pointer for Incidental Information Management

- 11 CRT Display Screen
- 12 Device Actuation Window
- 16 System Input/output Equipment for Maintenance Information Management
- 16a The system output unit for maintenance information management
- 16b The system input unit for maintenance information management
- 16c The system document output unit for maintenance information management
- 17 System for Maintenance Information Management
- 17a Maintenance information management manual stage
- 17b Maintenance information database
- 17c Maintenance information data radial transfer means
- 17d Maintenance information data-base-updating means
- 18 Maintenance Information Data Means of Communication

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the plant supervisory equipment which supervises and operates the condition of a plant and carries out operation control of the plant.

[0002]

[Description of the Prior Art] Generally plant supervisory equipment chooses and operates plant equipment by compounding the various amounts of processes sent out from a plant with fixed screen information, such as a plant system screen beforehand memorized in plant supervisory equipment, a group device actuation screen, and a trend screen, and displaying them on a screen, supervising a plant condition.

[0003] The process data which a plant system screen classifies a plant according to each system, graphic-screen-izes it, and is actually measured on the plant here. The equipment currently installed is displayed on a graphic screen and it is used for carrying out the package monitor of the operation situation of a plant according to each system. And a group device actuation screen Carry out grouping of the device actuation window beforehand according to an interference system process each system exception, and it is registered. Two or more device actuation windows are displayed on a screen, and a part for a maximum of 8 devices can be simultaneous-supervised, for example, it can be operated. A trend screen The measured process data is indicated by linearity at the order of time series on the X-Y diagram which made the X-axis time amount and made the Y-axis data range width of face for every measurement point, and it enables it to supervise change by time amount progress of each process data.

[0004] In addition, by processing according the plant equipment actuation which was being conventionally performed with the hard switch to software, a device actuation window summarizes a device actuation switch and a process data, device operational status, etc. for every device, displays them on the monitor screen of plant supervisory equipment, and enables device actuation from plant supervisory equipment.

[0005] The configuration of the 1st example of conventional plant supervisory equipment is shown in *drawing 20*. In *drawing 20*, from a plant 1, data-processing means 2e samples the various amounts of processes periodically, and notifies them to process-data management

tool 2b. Moreover, the demand from 2d of device actuation processing means notifies device operator command to a plant 1.

[0006] 2d of device actuation processing means judges what the demand of an operating staff is based on the data sent out from input-process means 2e, and they perform the display demand of a screen to output-processing means 2c at the same time it reads screen data in the screen-display demand of the above-mentioned plant system screen, a group device actuation screen, a trend screen, etc., and a plant equipment selection demand and they notify it to output-processing means 2c from screen data-table 2g. Moreover, in a plant equipment actuation demand, the demand of an operating staff performs the actuation output request to data-processing means 2a.

[0007] Output-processing means 2c performs a screen display to output unit 3a by the above-mentioned screen data and the screen output request from 2d of device actuation processing means. At the time of plant equipment actuation, output-processing means 2c displays the information on the plant equipment chosen from the above-mentioned screen data and process-data management tool 2b as said plant system screen on display with reference to the process data of the actuation device concerned.

[0008] The example of a screen at the time of plant equipment actuation is shown in *drawing 21*. Although it was operated by the device actuation window 211 which is displayed and which chose plant equipment from the plant system screens 210, and was displayed on the screen when plant equipment was operated so that *drawing 21* might show, at this time, the operating staff displayed the related information screen of the above-mentioned device for actuation by screen separation on the same CRT, and it was operating it, supervising related information. Moreover, in order to have checked the above-mentioned related information screen, it had to check by sorting out and requiring the information which an operating staff needs by the screen-display demand according to individual, respectively, retrieval and a display of a related information screen took time amount, and it had become the burden of an operating staff.

[0009] Moreover, the 2nd example of conventional plant supervisory equipment is explained with reference to *drawing 22*.

[0010] Conventionally, the information relevant to maintenance of a device was managed considering the document 19 as the base by the full-time person who mainly hits remedy operation. That is, the abnormalities of the device discovered by plant-supervisory equipment 2 are registered into maintenance information database 17b by the full-time remedy operation pursuer through input-device 16b and maintenance information management means 17a, and are further recorded on maintenance document 16c while they are recorded on a document 19. Therefore, in the operating staff actually engaged in operation of a plant, it always needed to check with the document base that transfer of such maintenance related information was performed proper. Moreover, these maintenance related information could not be referred to in plant supervisory equipment 2, but since the abnormalities of the device discovered within plant supervisory equipment 2 were not able to be immediately reflected in maintenance information, the operating staff needed to fill in the document uniquely and needed to transmit to the remedy operation pursuer.

[0011] Moreover, the 3rd example of conventional plant supervisory equipment is explained with reference to *drawing 23*.

[0012] Conventionally, as for the device related circumstance information concerning device actuation, many are mainly managed by means other than plant supervisory equipment 2 through the help — pasting of a communication note or a document, tag credit, for example, a paper ticket, and an adhesion seal and wait and a needle etc. shows. It restricted, when prohibition of device actuation was performed as an exception, and device actuation prohibition information was combined with either the process information managed with process-data management tool 2b or the actuation information managed by 2d of device actuation processing means and its both, and was managed. In this case, if an operating staff operates prohibition of device actuation from I/O device 3, according to actuation of the operating staff interpreted by input-process means 2e, it will display that 2d of device actuation processing means has the device concerned in the condition against actuation by rewriting of screen data table 2g on output unit 3a through output-processing means 2c. With other screen information, this screen display is combined with screen data table 2g, and is managed. Furthermore, any actuation to the device concerned by which actuation prohibition assignment of the 2d of the device actuation processing means is carried out is made not to be outputted to a plant 1 through data-processing means 2a.

[0013] In such plant supervisory equipment 2, the information which can treat an operating staff by the actuation which used I/O device 3

was only information which specifies prohibition of above-mentioned device actuation of many. About related information other than this, an inspection with either periodical for example, of the devices of a plant 1 etc. sake. When it is working by stationing authorized personnel in a site and the device cannot be operated on insurance, an operating staff in response to the notification, this is indicated to the note for communication, or the white sheet, and it manages by human being's hand, and said actuation prohibition information is set up using I/O device 3 of plant supervisory equipment 2. However, information, such as other related information, for example, the termination schedule time of day of this activity etc., was managing even in this case by recording with record means other than plant supervisory equipment 2, such as the above-mentioned note for communication, or a white sheet.

[0014] Moreover, the 4th example of conventional plant supervisory equipment is explained with reference to drawing 24. Generally, an ITV camera with sound-collecting equipment and a microphone are used for condition monitoring of the plant supervisory equipment for performing operation of a plant, and condition monitoring in the monitor of a power generating plant, and control, and the major equipment of a plant, abnormalities are detected from an image and a sound, and the abnormality detection system which emits an alarm is installed in the central operation room. Those systems are shown in drawing 24. Two or more CRT I/O devices 3 are installed, according to each system of a boiler, a turbine, and a generator, it divides [ 2-3 ], and arranges in [ each ] a control panel, and CRT operation performs actuation starting of equipments, such as a pump and a valve, a halt, open, and close in plant supervisory equipment 2 instead of hard switches. The manipulate signal from input unit 3b goes into input-process means 2e in plant supervisory equipment 2. From this input-process means 2e, a screen-display demand and a device actuation demand are performed. In a screen-display demand, with reference to related screen information table 2h and screen data table 2g, it is processed by 2d of device actuation processing means, and a demand is given to output-processing means 2c. In a device actuation demand, with reference to device information table 2f, it is processed by 2d of device actuation processing means, and a demand is given to output-processing means 2c. Output-processing means 2c performs a screen output to output unit 3a.

[0015] Moreover, in order that the abnormality detection system 9 which is a kind of plant supervisory equipment 2 may supervise the major equipment of a site, sound-collecting equipment and the ITV camera 7 are used for it, and it performs processing of an image and sound. And the image of an ITV camera with sound-collecting equipment is outputted to image output unit 10c. Processing of an image has the processing judged based on change, difference, etc. of a color and an illuminance performed by image processing system 9a in the abnormality detection system 9. Both these processed data and sound data detect an abnormal condition by image and acoustical-treatment computer 9b, and output an alarm to output unit 10a in the abnormality detection system control panel 10. Moreover, the sound-collecting equipment and the ITV camera 7 which have more than one are chosen, or input unit 10b in the abnormality detection system control panel 10 performs the change of an accompanying function.

[0016] It can carry out by using plant supervisory equipment and operation of a plant and a monitor concentrating by one place by this, and since actuation also of device actuation is possible by touching CRT, it becomes possible to aim at improvement in operability. Moreover, in emergency supervisory equipment, the condition of a monitor device is known on that spot to an image and a sound, and an image and a sound are saved as record.

[0017] In a power generating plant, the device related circumstance information which is needed in case device actuation is performed conventionally in order that it is not managed within plant supervisory equipment, or it is managed with another equipment, and an operating staff cannot refer to information easily but may manage these devices related circumstance information by the help. While it was obliged to employment top duplex management and was accompanied by troublesomeness, possibility that a human error would start was conceived.

[0018] In the function in which were made in order that this invention might solve these problems, and the 1st object performs device actuation from a plant system screen. When actuation device selection is performed, by performing not only a device actuation window but the display of the incidental information about the selected device, and a related screen within the same function, the amount of information with which an operating staff is provided is made to increase, and it is in reducing the actuation number of steps for a related screen or an incidental information display.

[0019] The 2nd object of this invention is to lose the troublesomeness accompanying the duplex management on employment of device related circumstance information, and enable it to refer to these devices related circumstance information easily by carrying out package management of the device information with plant supervisory equipment including device related circumstance information and maintenance information.

[0020] Furthermore, in conventional plant supervisory equipment, the plant control monitor board and abnormality detection equipment were another facilities, it was difficult for them to supervise both displays by turns, and the problem was in visibility. Moreover, in order to operate it with the control panel according to individual also on actuation, there is a problem also in the readiness of actuation.

[0021] The 3rd object of this invention can be performed so that there may not be operation and monitor operation mutually about trouble, it raises the operability of operation and a monitor, and visibility, and is to offer the plant supervisory equipment which can reduce an operation burden.

[0022]

[Means for Solving the Problem] The plant supervisory equipment by the 1st invention with a plant system screen, a group device actuation screen, a trend screen, and the screen data table that consists of a fixed indicative data of each device actuation window, and an adjustable indicative data. The device information data table with which the device actuation window number about each actuation device and the tag or \*\*\*\*\* table number were registered for said every plant system screen. The related screen information table on which the screen number of the group device actuation screen related about each actuation device for said every plant system screen and a DORENDO screen is registered. The indicative data of this plant system screen by searching said screen data table, when the operating staff is demanding the display demand of a plant system screen Drawing. The screen data of the device actuation window of the actuation device chosen by the operating staff when the operating staff was demanding device selection. The incidental information on said actuation device by searching said device information table, while taking out by searching said device information table and a screen data table Drawing. The related screen of said actuation device by searching said related screen information table and a screen data table Drawing. Furthermore, drawing. A device actuation processing means to output a cutback demand when opting for and giving a panel division indication of whether such taken-out screen information is indicated by the icon according to a display, or it indicates by panel division. A screen cutback processing means to reduce the screen information taken out by said device actuation processing means based on said cutback demand. In an icon display, the screen information taken out by said device actuation processing means is displayed on said display as it is. In a panel division display. Plant supervisory equipment characterized by having a display-control means to display on said display the screen information reduced by said screen cutback processing means.

[0023] Moreover, the 1st mode of the plant supervisory equipment by the 2nd invention in the plant supervisory equipment which chooses and operates plant equipment while compounding the process data of a plant with the fixed screen information of a plant, displaying it on the screen of an output unit and supervising the condition of a plant. An incidental information storing means by which the maintenance information data of said plant equipment are stored. An incidental information management means to have the maintenance information management table which consists of maintenance information management data which manage said maintenance information. The device information table on which the index pointer for having the information for performing monitor and actuation of said device collectively, and referring to the maintenance information management data of said incidental information management means is stored. Based on the

demand from an operating staff, said index pointer about said device with reference to said device information table Drawing. An incidental information setting-out means to perform setting-out registration and deletion of the maintenance information data which correspond with reference to said maintenance information management data based on this index pointer. In order to manage the maintenance information on said plant equipment, when said maintenance information data are updated by said incidental information setting-out means While updating the maintenance information database in the maintenance information management system formed outside, it is characterized by having the maintenance information management means which transmits the updating demand from said maintenance information management system, and updating data to said incidental information setting-out means.

[0024] Moreover, the 2nd mode of the plant supervisory equipment by the 2nd invention In the plant supervisory equipment which chooses and operates plant equipment while compounding the process data of a plant with the fixed screen information of a plant, displaying it on the screen of an output unit and supervising the condition of a plant. The content of display managed table which manages the content displayed on said output unit as an incidental information storing means by which incidental information is stored. The incidental information management means which consists of an actuation information table which manages actuation related information, and a language information management table which manages the natural language information set up if needed. The device information table on which the index pointer for having the information for performing monitor and actuation of said said device collectively, and referring to each table of said incidental information management means is stored. Based on the demand from an operating staff, the index pointer about said device with reference to said device information table Drawing. Plant supervisory equipment characterized by having an incidental information setting-out means to perform the edit and setting out of incidental information which correspond with reference to the table of said incidental information management means based on this index pointer.

[0025] Moreover, the plant supervisory equipment by the 3rd invention photos the situation of the site of a plant using two or more photography equipments. In the plant supervisory equipment which detects abnormalities by processing the image sent out from said photography equipment with an image-processing means An actuation means to move the swivel base into which the photography equipment which projects said object device operated among the photography equipment of a base by the advice of device actuation from a device actuation screen is chosen as, and the sense of this photography equipment is changed. [two or more] The positional information table which memorizes the positional information of said photography equipment, and the actuation means of communication which transmits the operator command of said photography equipment which projects the device which is an object for actuation using the positional information from this positional information table to said image-processing means. The device information table on which the information about said plant equipment is stored, and a display-control means to display information and data on a display. When abnormalities are detected by the image processing, while notifying this detection result to said display-control means, it is characterized by having an abnormality detection data-processing means to record generating of abnormalities on said device information table.

[0026]

[Function] In case device actuation is performed from a plant system screen according to the plant supervisory equipment by the 1st invention constituted as mentioned above If the device set as the object of actuation is chosen, the group actuation screen number and trend screen number to which a device actuation processing means relates will be searched from a related screen information cable. Search the device actuation window number and tag or \*\*\*\*\* table number of the device for actuation from a device information table, and a group device actuation screen, a trend screen, and the screen data of a device actuation window are made into an indicative data. Since it notifies to a display-control means with a tag or \*\*\*\*\* (incidental information) and a display-control means displays simultaneously a device actuation window, a group device actuation screen, a trend screen, a tag, or \*\*\*\*\* on a display Without changing a function, a group actuation screen and a trend screen can be referred as a related screen, and refer to a tag, \*\*\*\*\* and the maintenance information for an operating staff as incidental information.

[0027] According to the 1st mode of the plant supervisory equipment of the 2nd invention constituted as mentioned above, moreover, on a device information table The incidental information management means which an operating staff operates using commercial-plant supervisory equipment in a plant and which has a maintenance information management cable as incidental information for every device. When it has the information for searching in order an incidental information storing means to store maintenance information for every device in these bases and a maintenance information management means refers to said incidental information management means and said incidental information storing means According to this, the information relevant to maintenance of the device concerned can be displayed outside.

[0028] Furthermore, based on the demand of an operating staff, it becomes possible to resemble an incidental information setting-out means and an incidental information management means, and to change the content of the incidental information storing means more, and when an operating staff is arbitration, the maintenance information on a device can be set up and edited. Moreover, this can be transmitted to a maintenance information management system through a maintenance information management means, and maintenance information data can be updated now. Thereby, conventionally, when that by which many were managed with means other than plant supervisory equipment through acquisition can manage unitary in a maintenance information database from the former with plant supervisory equipment, mainly while a document etc. prevents the mistake by duplex management, the device related circumstance information concerning maintenance loses troublesomeness, and the improvement in effectiveness of operation of it is attained.

[0029] According to the 2nd mode of the plant supervisory equipment of the 2nd invention constituted as mentioned above, moreover, on a device information table For every device which an operating staff operates using commercial-plant supervisory equipment in a plant The content of display managed table which manages the content displayed on an output unit, the actuation information table which manages the information relevant to actuation of a device, And the incidental information management means which consists of a language information management table which manages the natural language information on others which are set up if needed. Whenever it has the information for searching in order an incidental information storing means to store information for every device in these bases and actuation of a device is performed, when a device actuation processing means refers to an incidental information management means and said incidental information storing means According to this, perform prohibition of actuation of the device concerned based on the information relevant to actuation of the device concerned, or Moreover, it can be managed by the incidental information management means, the incidental information currently recorded on the incidental information storing means can be outputted outside, and it can output to a display by making the content of incidental information into a graphic.

[0030] Furthermore, the incidental information on a device can be set up and edited by resembling an incidental information setting-out means and an incidental information management means, and changing the content of the incidental information storing means more based on the demand of an operating staff. Conventionally the device related circumstance information concerning device actuation Pasting of a communication note or a document, tag credit, for example, a paper ticket, and an adhesion seal and the incidental information for which many were managed by means other than plant supervisory equipment through a help — wait and a needle etc. shows — mainly with plant supervisory equipment While preventing the mistake by duplex management by managing unitary, troublesomeness is lost and the improvement in effectiveness of operation operation is attained.

[0031] Moreover, according to the plant supervisory equipment of the 3rd invention constituted as mentioned above When device actuation is performed, the photography equipment for [ of the photography equipment currently installed two or more sets using the device manipulate signal ] actuation is judged. Move a swivel base and by outputting the projected image to the same display with a device

actuation window and a plant system screen so that the judged photography equipment may move an object device While visibility improves in plant monitor operation, also in operation of a plant, a check of operation can be simultaneously performed at the time of actuation of a device.

[0032] Moreover, by having the result of the abnormality detection by the image processing in a device information table, this detects abnormalities and it also becomes possible to switch and display an actuation screen on a case.

[0033]

[Example] The configuration of one example of the plant supervisory equipment by the 1st this invention is shown in drawing 1. The plant supervisory equipment 2 of this example is equipped with data-processing means 2a, process-data management tool 2b, output-processing means 2c, 2d of device actuation processing means and input-process means 2e, device information table 2f, screen data table 2g, related screen information table 2h, and screen outback processing means 2u.

[0034] Data-processing means 2a notifies device operator command to a plant 1 by the demand from 2d of device actuation processing means while it samples the process data of a plant 1 with a predetermined period and sends out this process data to process-data management tool 2b. Process-data management tool 2b sends out the process data from process-data-processing means 2a to output-processing means 2c, when there is a demand from output-processing means 2c. Output-processing means 2c performs screen-display processing of the process data sent out from process-data management tool 2b, and the various indicative data notified from 2d of device actuation processing means, and screen outback processing means 2u, and displays it on output unit 3a in CRT I/O device 3.

[0035] While 2d of device actuation processing means gives the outback demand of the screen data of the screen data table 2g displayed on output unit 3a to screen outback processing means 2u. The indicative data of the plant system screen which the operating staff notified from input-process means 2e requires. The indicative data of the device actuation window of the device which an operating staff requires, the indicative data of a related screen (a group device actuation screen and trend screen), and the table number of incidental information (a tag or \*\*\*\*\*) are searched, and it notifies to output-processing means 2c.

[0036] An operating staff processes the various demands inputted through input unit 3b in CRT I/O device 3, and notifies input-process means 2e to 2d of device actuation processing means. The tag or \*\*\*\*\* table number is registered device information table 2f. A fixed indicative data and adjustable indicative data, such as a plant system screen, a group device actuation screen, a trend screen, and a device actuation window, are stored screen data table 2g. The group device actuation screen number and the trend screen number are registered related screen information table 2h as a related screen of the device for actuation contained all over a plant system screen.

[0037] Next, actuation of the 1st example is explained with reference to drawing 2. In addition, drawing 2 is a flow chart which shows the procedure of 2d of device actuation processing means. First, the display demand of the plant system screen for performing device actuation to plant supervisory equipment 2 is sent to input-process means 2e by the operating staff through input unit 3b. The plant system screen number is contained in this display demand, and this plant system screen number is notified to 2d of device actuation processing means by input-process means 2e (step F1 reference). Then, 2d of device actuation processing means searches screen data table 2g based on the plant system screen number notified from input-process means 2e, and they take out the fixed indicative data and adjustable indicative data which are registered as corresponding screen data, and notify them to output-processing means 2c (step F2, F14 reference). Output-processing means 2c displays the fixed indicative data notified from 2d of device actuation processing means on output unit 3a, and displays the process data which corresponds from process-data management tool 2b based on an adjustable indicative data further on drawing output unit 3a. Thus, a plant system screen is displayed on output unit 3a.

[0038] If a series of processings are completed and 2d of device actuation processing means reaches step F15, they will stand by the input again sent to the input (step F0) of the flow chart shown in drawing 2 from return and input-process means 2e.

[0039] If the device which an operating staff should operate through input unit 3b from on the plant system screen currently displayed on output unit 3a is chosen, input-process means 2e will notify X-Y coordinate of the device which the operating staff chose to 2d of device actuation processing means (step F1, F3 reference). And if output unit 3a is small CRT in step F7, as it progresses to steps F8, F9, and F14 end is shown in drawing 3 (b), expansion of a device actuation window will be performed, and advice will be made by output-processing means 2c so that an icon may be displayed on a plant system screen.

[0040] On the other hand, if output unit 3a is large-sized CRT in step F7, it will progress to step F10. 2d of device actuation processing means X-Y coordinate notified from input-process means 2e collates with the fixed indicative data of the plant system screen searched from screen data table 2g. Determine the equipment item number of the actuation device which the operating staff chose, and device information table 2f is searched based on this equipment item number and a plant system screen number. The device actuation window number and tag or \*\*\*\*\* table number corresponding to the device chosen on the plant system screen currently displayed on output unit 3a are taken out. Then, it progresses to step F11, and 2d of device actuation processing means searches related screen information table 2h based on a plant system screen number and an equipment item number, and they take out the group device actuation number and trend screen number which are registered. And it progresses to step F12, a screen data table is searched based on a group device actuation screen number, a trend screen number, and a device actuation window number, and a fixed indicative data and an adjustable indicative data are taken out.

[0041] Then, while 2d of device actuation processing means notifies a plant system screen number to screen outback processing means 2u, the outback demand of a screen is performed (step F13 reference). Then, after screen outback processing means 2u searches screen data table 2g based on a plant system screen number, it performs drawing and outback processing and notifies screen data to output-processing means 2c through 2d of device actuation processing means (step F14 reference). Output-processing means 2c is displayed on output unit 3a by making into an indicative data the screen data by which outback processing was carried out. Since output unit 3a is large-sized CRT at this time as mentioned above, as shown in drawing 4, a panel division indication of the screen data is given. That is, a plant system screen, a group device actuation screen, a trend screen, a device actuation window and a tag, or \*\*\*\*\* is displayed on each display area of output unit 3a. (CR) [0042] In addition, if the input sent out from input-process means 2e is an icon actuation demand, in the device selection step F3 shown in drawing 2, it will progress to step F4. It is distinguished whether input is an icon actuation demand, and processing will be ended if it is not an icon actuation demand. When it is an icon actuation demand, it progresses to step F5. Device information table 2f, A closing motion demand of drawing and related screen information table 2h (refer to the drawing 2 steps F6 and F14 and drawing 3 (c)). In addition, as the equipment item number, the device actuation window number, the incidental information table pointer, etc. are respectively recorded on device information table 2f for every plant system screen as shown in drawing 5, and shown in screen data table 2g at drawing 6. For every plant system screen, a plant system screen, a group device actuation screen, The fixed indicative data and adjustable indicative data of a trend screen and device actuation are recorded, it gets down, and the equipment item number, the group device actuation screen, the trend screen, etc. are recorded on related screen information table 2h for every plant system screen.

[0043] As explained above, according to this example, the actuation device selection demand of an operating staff. The reduced display of the plant system screen display currently displayed on the screen of output unit 3a is carried out. To the screen-display opening area of output unit 3a, a related information screen and the incidental information are indicated by automatic. By switching and carrying out whether these functions are considered as an icon display with the display engine performance of output unit 3a by having the function to operate plant equipment, referring to related information, or it considers as a panel division display Hard to see [ of the display given to an

operating staff ] by lowering of the screen-display resolution of an output unit at the time of a screen cutback. While becoming possible about plant equipment actuation in the condition of having stopped, when actuation device selection is performed again. Can also perform not only a device actuation window but the display of the incidental information about the selected device, and a related screen within the same function, the amount of information with which an operating staff is provided is made to increase, and the actuation number of steps for a related screen or an incidental information display can be reduced.

[0044] Next, the configuration of the 1st example of the plant supervisory equipment by the 2nd invention is shown in drawing 8. The plant supervisory equipment 2 of this example newly prepares device information table 2f, 2l of attached information setting-out means, 2m of attached information management means, 2n of attached information storing means, maintenance information data radial transfer means 2w, and maintenance information management means 2x in the conventional plant supervisory equipment 2 shown in drawing 22. In addition, maintenance information management TEUFURU 2 is contained in 2m of attached information management means, and maintenance information data 2o is contained in 2n of attached information storing means. Moreover, maintenance information data radial transfer means 17c and 17d of maintenance information data-base-updating means are newly formed in the maintenance information management system 17 under management of a remedy operation exclusive duty person.

[0045] In this example, all are managed by 2m of incidental information management means about the information concerning plant equipment. Device information table 2f, it has as data the pointer which refers to maintenance information management table 2y, about all the information that is needed for a monitor and actuation of the device concerned. The index pointer in which the storing location of the maintenance information on the device concerned is shown also about maintenance information table 2o in 2n of incidental information storing means is stored in maintenance information management table 2y for every device.

[0046] In addition, with reference to the index pointer stored in device information table 2f, it carries out also with the case where maintenance information data 2o currently recorded on 2n of incidental information storing means by 2l of incidental information setting-out means is edited or registered also about the case where maintenance information data 2o currently recorded on 2n of incidental information storing means by maintenance information management means 2x is referred to.

[0047] Maintenance information management table 2y which constitutes 2m of incidental information management means has the pointer in which the reference point of maintenance information data 2o within 2n of incidental information storing means is shown, and its data length for every device. That is, the content of actual maintenance information itself is referred to from maintenance information management table 2y and 2n of incidental information storing means.

[0048] Drawing 9 shows the relation of these table formats, and drawing 10 is a flow chart which shows the process in the case of referring to 2o for the maintenance information data currently recorded on 2n of incidental information storing means by maintenance information management means 2x.

[0049] For example, in plant supervisory equipment 2, in order to refer to maintenance information, from the location of the memory of 2n of incidental information storing means, the information relevant to maintenance of a device is passed to output-processing means 2c with reference to the maintenance information data of this device with reference to the location shown by maintenance information management table 2y, and this is displayed on output unit (CRT) 3a of I/O device 3.

[0050] In this case, a demand is first made from maintenance information management means 2x by 2d of device actuation processing means (step F21 reference of drawing 10), and device information table 2f is referred by 2d of this device actuation processing means (step F22 reference). After acquiring the pointer 4 for incidental information management shown in drawing 9 here and acquiring the start address of maintenance information management table 2y made into the object (step F23 reference), the address which carried out the index according to the pointer is referred to. By this, the data length of the address which is 2n of incidental information storing means by which the actuation information on the device made into the object is recorded, and actuation information is acquired, and maintenance information data 2o is acquired with reference to (Step F24 Reference) and this part (step F25 reference). Maintenance information will be displayed based on this (step F26 reference).

[0051] About the case where the maintenance information currently recorded on 2n of incidental information storing means by the incidental information setting-out means 2l is edited or registered on the other hand, 2n of incidental information storing means is updated by updating the address and the data length which are recorded on maintenance information management table 2m of incidental information management means 2y in maintenance information management table 2y with a device information table 2f index.

[0052] The procedure at this time is shown in the flow chart of drawing 11. For example, by maintenance information setting-out demand actuation from input unit 3b by the operating staff, if setting-out demand actuation is interpreted by input-process means 2e, the identification number (equipment item number) of this device and the data with which the content of a demand was included will be passed to the incidental information setting-out means 2l (step F31 reference). Next, based on an equipment item number, the pointer 4 for incidental information management is acquired from device information table 2f (step F32 reference), and the maintenance information data of the applicable device of maintenance information management table 2y are acquired with reference to the start address of maintenance information management table 2y which manages the location which stores the maintenance information taken out from this and a write request (step F33 reference). That is, if the empty area corresponding to this can be secured to 2n of memory areas, i.e., an incidental information storing means, with reference to the data length of new maintenance information data, the start address and data length are updated as data of maintenance information management table 2y (steps F34 and F35), and maintenance information data are further updated in the secured area here (step F36 reference). An error is returned if not securable (step F37 reference).

[0053] Like [ when deleting data ] the case of setting out of the incidental information mentioned above. The equipment item number of the device by which the deletion demand was carried out from device information table 2f is referred to. The device starting address concerned in maintenance information management table 2y, and a data length Maintenance information data 2o should be beforehand deleted within the program which scans 2n of incidental information storing means by rewriting the above-mentioned starting address and the above-mentioned data length to the numeric value prescribed that it is judged that he has no incidental information (step F38 reference).

[0054] On the other hand, since maintenance information database 17b in the maintenance information management system 17 contains the management information except being needed for plant supervisory equipment, it is not set in plant supervisory equipment 2. It shall have separately the system 17 for maintenance information management under management of a remedy operation exclusive duty person, and shall be managed in this. Therefore, in order to make it not cause the mismatching between plant supervisory equipment 2 and the system 17 for maintenance information management, when modification arises in which side, it has the structure which updates each other data automatically. This is performed by maintenance information management means 2x or maintenance information management manual stage 17a. As shown in drawing 12, when it judges that modification arose (step F41 reference), maintenance information management means 2x or maintenance information management manual stage 17a. This is notified to drawing (step F42 reference) and maintenance information data radial transfer means 2w or 17c (step F43 reference), and maintenance information is transmitted to another side through a maintenance information data means of communication 18 with reference to each maintenance information data, respectively (step F44 reference).

[0055] If this is received by the system 17 side for maintenance information management, the updating demand to 17d of maintenance information data radial transfer will be performed by 17d of maintenance information data-base-updating means.

[0056] Moreover, in the plant supervisory equipment 2 side, if an updating demand of maintenance information is received, this will be

notified to the incidental information setting-out means 21, and this will update maintenance information data 2o (steps F46 and F47, F48 reference).

[0057] As explained above, according to this example, conventionally with a plant log sheet, an activity communication table, etc. With reference to the maintenance information database of the maintenance information management system 17 independently created and managed as remedy operation in plant supervisory equipment 2, by having enabled it to manage It enables an operating staff to refer to easily the device maintenance information which is needed in case device actuation is performed. It notifies or displays on an operating staff that there is furthermore this maintenance information through an output unit. Moreover, accept the need, setting-out-register, or delete maintenance information, and the operation which was being conventionally performed with the document for maintenance communication etc. is created on-line. By the ability registering, by carrying out package management of the device information, the troublesomeness accompanying the duplex management on employment of device related circumstance information is lost, and these devices related circumstance information can be easily referred to including device related circumstance information and maintenance information.

[0058] Next, the configuration of the 2nd example of the plant supervisory equipment by the 2nd invention is shown in drawing 13. The plant supervisory equipment 2 of this example newly establishes device information table 2f, 2l, of incidental information setting-out means and an incidental information management means, and 2n of incidental information storing means in the conventional plant supervisory equipment shown in drawing 23. And foreground-color table 2g and display configuration managed table 2i, actuation information table 2j, and graphic-character managed table 2p are contained in 2m of incidental information management means.

[0059] In this example, all are managed by device information table 2f about the information concerning plant equipment. Although it has as data the pointer which refers to the information table device information table 2f about all the information that is needed for a monitor and actuation of the device concerned, also about 2m also of incidental information management means Graphic-character managed table 2p which constitutes this, foreground-color table 2g. It has in common with all of display configuration managed table 2i, actuation information table 2j, and language information management table 2k, and the index pointer in which the storing location of the administrative information on the device concerned which can be shown is stored for every device.

[0060] With reference to the index pointer stored in device information table 2f, it carries out also with the case where the incidental information currently recorded on 2n of incidental information storing means by the incidental information setting-out means 21 is edited or registered also about the case where the incidental information currently recorded on 2n of incidental information storing means by 2d of device actuation processing means is referred to.

[0061] The content of the alphabetic character which displays each of graphic-character managed table 2p which constitutes 2m of incidental information management means, foreground-color table 2g, display configuration managed table 2i, actuation information table 2j, and language information management table 2k as incidental information. It has the pointer in which the reference part of 2n of incidental information storing means to store the language information as the color of a graphic and a configuration, the information relevant to actuation of a device, and circumstance information is shown, and its data length for every device. That is, the content of actual incidental information itself is referred from 2n of incidental information storing means by the pointer and data length of each table of graphic-character managed table 2p, foreground-color table 2g, display configuration managed table 2i, actuation information table 2j, and language information management table 2k. The relation of these table formats is shown in drawing 14.

[0062] About the case where the incidental information currently recorded on 2n of incidental information storing means by 2d of device actuation processing means is referred to, the process is shown in the flow chart of drawing 15. For example, in order to use to forbid actuation of this device by the tag credit function to the device actuation window which is one function of plant supervisory equipment, i.e., failure of a device etc., temporarily By the function which displays the tag which specifies this purpose on a device actuation window, in order to realize actuation to the device concerned From the location of the memory currently prepared as 2n of incidental information storing means The data of \*\* are referred to [whether actuation is forbidden to this device with reference to the location shown by actuation information table 2j in the information relevant to actuation of this device, and]. It must judge whether the actuation from CRT I/O device 3 of the operating staff to the device concerned is received.

[0063] In this case, device information table 2f is first referred by 2d of device actuation processing means (step F51 reference). After acquiring the pointer 4 for incidental information management shown in drawing 14 here and acquiring the start address of actuation information table 2i made into the object (step F52 reference), the address which carried out the index according to the pointer for incidental information management is referred to. By this, the data length of the address which is 2n of incidental information storing means by which the actuation information on the device made into the object is recorded, and actuation information is acquired (step F53 reference), and incidental information data are acquired with reference to this part (step F54 reference). It will be judged based on this whether device actuation is possible (step F55 reference).

[0064] In addition, in the function in which an operating staff can set the content of the graphic character of the tag at the time of the arbitration setting up function of a graphic character used by a tag credit function etc., i.e., a tag, having started as arbitration etc., the location in which data, such as a graphic character, are stored with reference to graphic-character managed table 2p from device information table 2f can be accessed similarly.

[0065] About the case where the incidental information currently recorded on 2n of incidental information storing means by the incidental information setting-out means 21 is edited or registered on the other hand Graphic-character managed table 2p which constitutes 2m of incidental information management means with a device information table 2f index, Foreground-color table 2g, display configuration managed table 2i, actuation information table 2j, Each of language information management table 2k is updated to each of graphic-character managed table 2p, the content of modification The data length of the item into which it changes is newly updated to actuation information table 2j, and language information management table 2p, foreground-color table 2g, display configuration managed table 2i, actuation information table 2j, and language information management table 2k. And 2n of incidental information storing means is updated. The procedure at this time is shown in the flow chart of drawing 16.

[0066] For example, when the function in which tag credit is recorded for every device in case a note of fixed number of letters is made instead of the memorandum setting-out demand actuation from input unit 3b by the operating staff, if memorandum setting-out demand actuation is interpreted by input-process means 2a The identification number of this device, and the content of a demand and the data with which memorandum sentence data and the write request of a memorandum sentence were contained in this case are passed to 2l of incidental information setting-out means (step F61 reference). Next, by the equipment item number, the pointer 4 for incidental information management is acquired from device information table 2f (step F62 reference), and the management information data of the applicable device of language information management table 2k are acquired with reference to the start address of language information management table 2k which manages the location which stores the memorandum sentence taken out from the write request of this and a memorandum sentence (step F63 reference). That is, if the empty area corresponding to this can be secured to 2n of memory areas, i.e., an incidental information storing means, with reference to the data length of a new memorandum sentence, the start address and data length are updated as data of language information management table 2k (step F64, F65 reference), and the data of a memorandum sentence are further updated in the secured area here (step F66 reference). An error is returned if reservation is impossible (step F67).

[0067] Thus, the variable-length data in other, for example, the configuration of a display tag etc., enables updating and edit, moreover, in



deleting the incidental information set as each device. The index of the device by which the deletion demand was carried out from device information table 2f is referred to like the setting-out approach of the incidental information mentioned above. The device starting address concerned in graphic-character managed table 2p, and a data length. The incidental information on a device should be beforehand deleted within the program which scans 2n of incidental information storing means by rewriting a starting address and a data length to the numeric value prescribed that it is judged that he has no incidental information (indeterminate).

[0068] It treats as incidental information by this example, and what is mentioned in 2n of incidental information storing means is raised to drawing 17, and the table format within 2n of incidental information storing means is mentioned to it.

[0069] The incidental information management means which consists of a language information management table which manages the natural language information on others which are set up if needed according to this example as explained above. An incidental information storing means to store the data of these incidental information actually. An operating staff setting-out registration and deletion of said incidental information from plant supervisory equipment. The incidental information setting-out means which makes it possible to edit said incidental information management means \*\*\*\* incidental information storing means in case it carries out to arbitration is added. Conventionally with a plant log sheet, an activity communication table, etc. An operating staff can be enabled to recognize or refer to easily the device related circumstance information which is needed in case device actuation is performed by carrying out unitary management of the incidental information (device related circumstance information) which the operating staff had created and managed and which shows a device condition.

[0070] The troublesomeness accompanying the duplex management on employment of device related circumstance information is lost by carrying out package management of the device information including device related circumstance information and maintenance information, and these device related circumstance information can refer to easily by notifying or displaying on an operating staff that there is furthermore this incidental information through an output unit, and accepting the need, setting-out-registering or deleting incidental information.

[0071] Next, the configuration of one example of the plant supervisory equipment by the 3rd invention is shown in drawing 18. The plant supervisory equipment 2 of this example newly prepares camera actuation judging means 2r, camera positional information table 2s, and 2t of camera actuation means of communication and abnormality detection data-processing means 2v in the conventional plant supervisory equipment shown in drawing 24.

[0072] In this example, camera positional information table 2s for memorizing the positional information of the ITV camera 7 with sound-collecting equipment for the monitor of the device of a site with the monitor of a plant and actuation is prepared, and the positional information over the device which each ITV camera 7 with sound-collecting equipment installed two or more sets supervises is memorized. An operator demands device selection in a system screen, and device actuation from a device actuation screen from input unit 3b of CRT I/O device 3, and notifies processing of screen processed data and the information on the device operated to input-process means 2e.

From input-process means 2e, screen modification and device actuation are notified to 2d of device actuation processing means, and it processes with reference to each information (device information table 2f, screen data table 2g, and related screen information table 2h). [0073] And the data of the processed device rewrite information, such as device information table 2f and screen data table 2g. With reference to device information table 2f and camera positional information table 2s, judgment of a camera and sorting processing of positional information are performed in camera actuation judging means 2r for advice of the judgment of a camera to a monitor device, or actuation. This camera distinction processing and the sorting result of positional information are notified to 2t of camera actuation means of communication. And a demand is sent to the image and acoustical-treatment computer 9b of the abnormality detection system 9 from 2t of this camera actuation means of communication. In an image and acoustical-treatment computer 9b, processing changed to the ITV camera 7 with sound-collecting equipment corresponding to an actuation device and demand processing for operating a swivel base 8 are performed, and an operational request is performed to a swivel base 8.

[0074] The image from the ITV camera 7 with sound-collecting equipment for an actuation device is sent to image processing system 9a in the abnormality detection system 9, and after processing is made, processing for abnormality detection is performed with the vibrating reed from sound-collecting equipment in an image and acoustical-treatment computer 9b. A monitor image and a processing image are sent to output-processing means 2c through abnormality detection data-processing means 2v. In abnormality detection data-processing means 2v, the detection result of the actuation device concerned is returned to device information table 2f. Moreover, an image image data etc. is passed to output-processing means 2c as it is. In addition, the data from process-data management tool 2b which saves the screen data processed by 2d of device actuation processing means, the information on device actuation, and the process value which came out from the plant 1 are sent to output-processing means 2c, and it displays on it to output unit 3a of CRT I/O device 3.

[0075] Each function of the abnormality detection system 9 can be operated from input unit 3b of CRT I/O device 3. An actuation screen and the display with which the on-site image of the actuation device was outputted are shown in drawing 19. In drawing 19, in 11, a device actuation window and 13 show an ITV camera image screen, and, as for a CRT display screen and 12, 14 shows the abnormality detection system display screen.

[0076] According to the above example, by this invention, it becomes possible to display the image of a monitor and an actuation device on CRT I/O device 3 of plant supervisory equipment 2 with a device actuation window and a plant system screen, the ITV camera 7 with sound-collecting equipment which projects the actuation device by the device actuation demand from input unit 3b can be changed, and the monitor image can be outputted now to output unit 3a.

[0077] As explained above, according to this example, the result of detection by abnormality detection equipment can be easily referred to on the plant control monitor board, and both displays can be supervised simultaneously. Moreover, since it is operated with the same control panel also on actuation, mutually, trouble can be carried out also to the readiness of actuation so that there may be nothing, the operability of operation and a monitor and visibility can be raised, and an operation burden can be reduced.

[0078]

[Effect of the Invention] As stated above, when actuation device selection is performed according to the 1st invention, by performing not only a device actuation window but the display of the incidental information about the selected device, and a related screen by the same function, the amount of information with which an operating staff is provided is made to increase, and the actuation number of steps for a related screen or an incidental information display can be reduced.

[0079] Moreover, including device related circumstance information and maintenance information, by carrying out package management of the device information, the troublesomeness accompanying the duplex management on employment of device related circumstance information can be lost, and, according to the 2nd invention, these device related circumstance information can be easily referred to with plant supervisory equipment.

[0080] Moreover, according to the 3rd invention, it can carry out so that there may not be operation and monitor operation mutually about trouble, and the operability of operation and a monitor and visibility can be raised, and an operation burden can be reduced.

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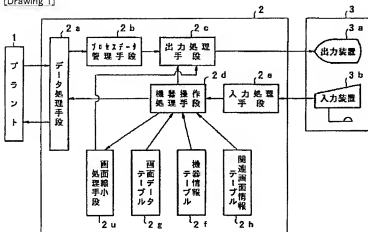
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\* shows the word which can not be translated.

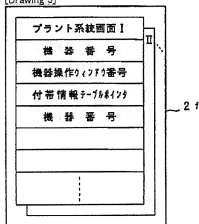
3.In the drawings, any words are not translated.

## DRAWINGS

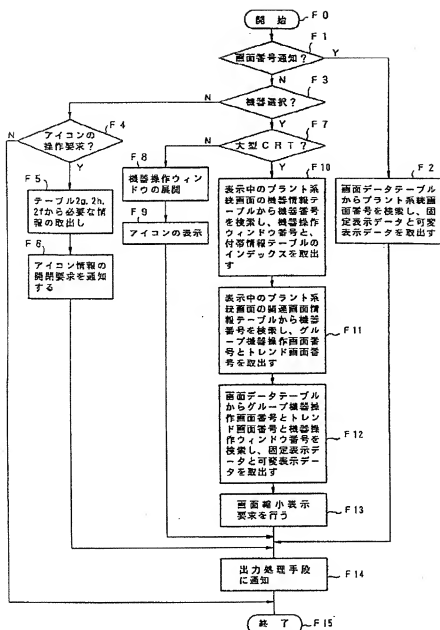
[Drawing 1]



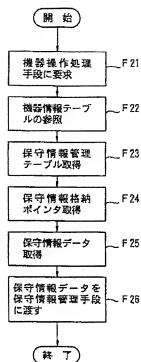
[Drawing 5]



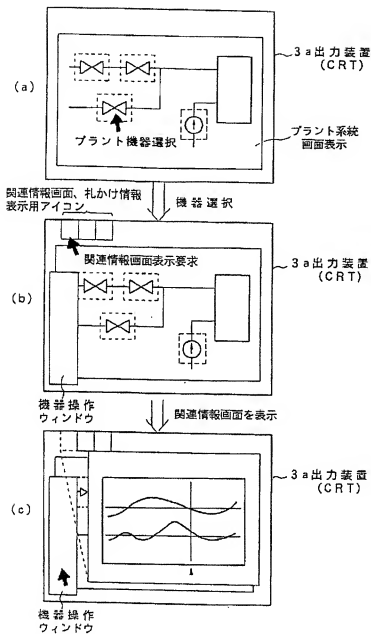
[Drawing 2]



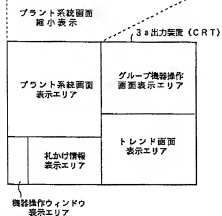
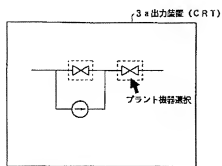
[Drawing 10]



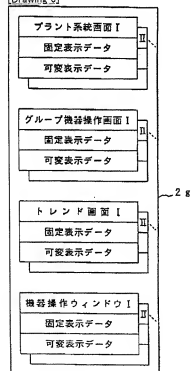
[Drawing 3]



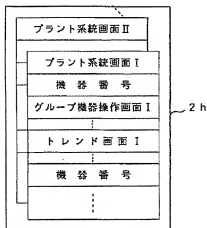
[Drawing 4]



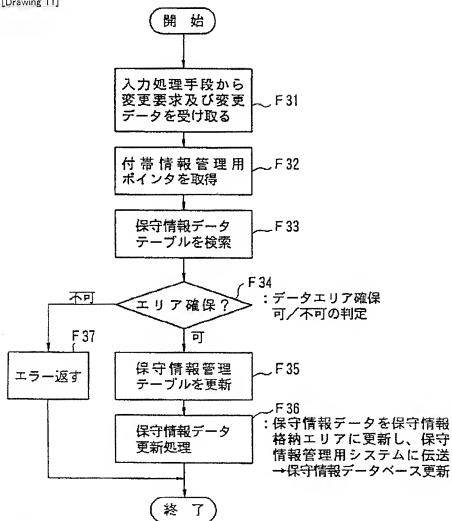
[Drawing 6]



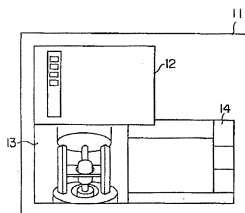
[Drawing 7]



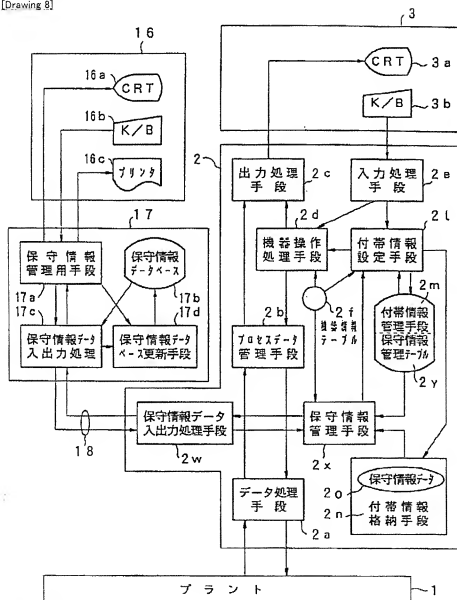
[Drawing. 11]



[Drawing. 19]

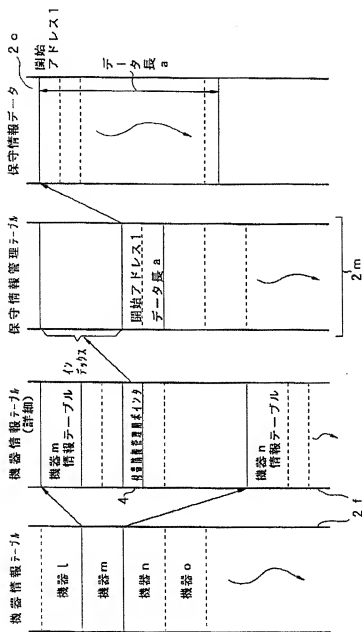


[Drawing 8]

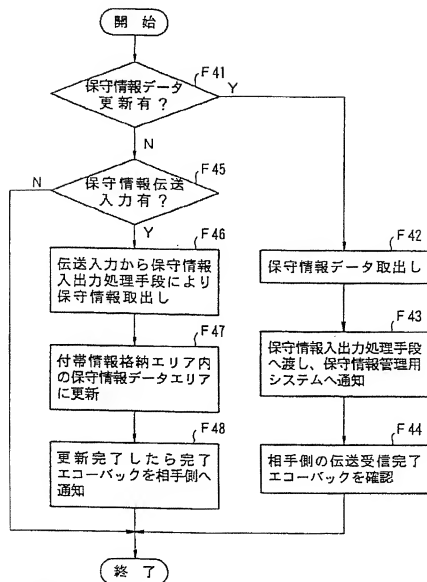


[Drawing 9]

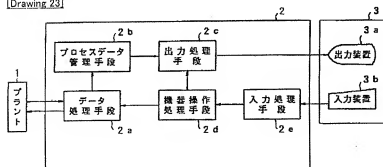




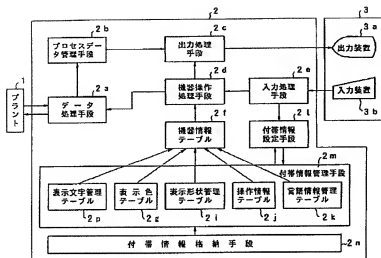
[Drawing 12]



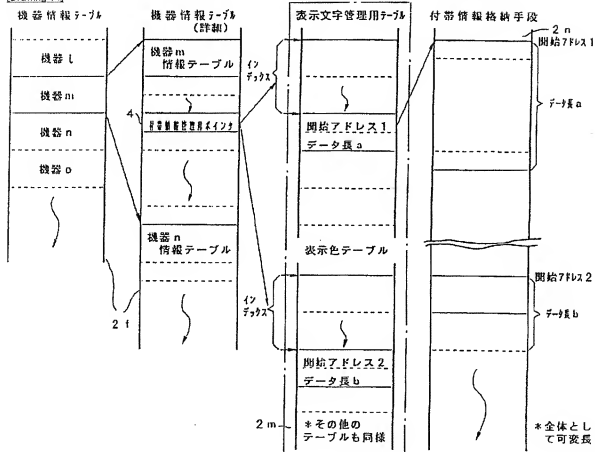
[Drawing 23]



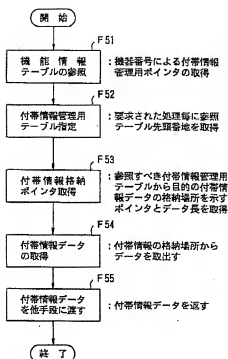
[Drawing 13]



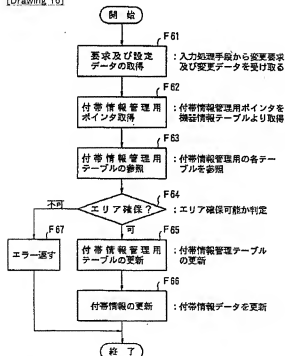
[Drawing 14]



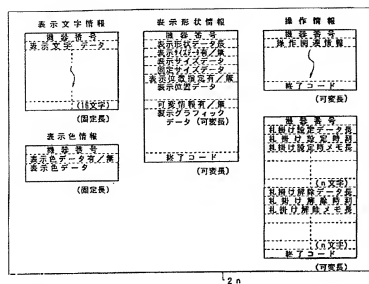
[Drawing 15]



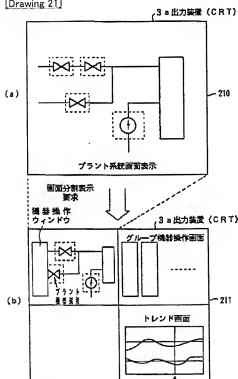
[Drawing 16]



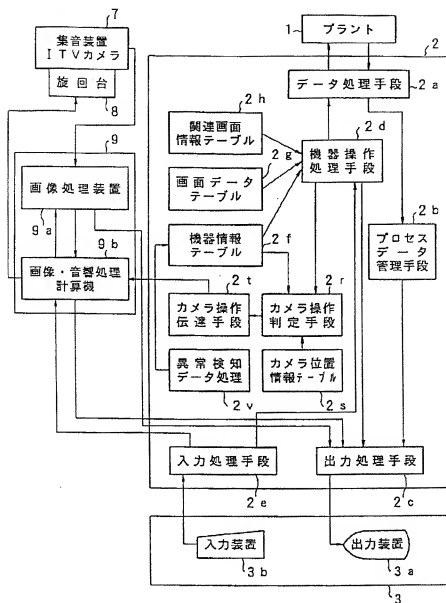
[Drawing 17]



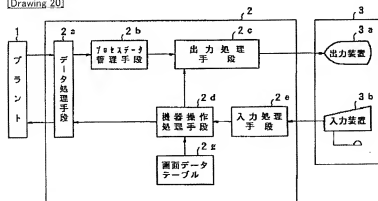
[Drawing 21]



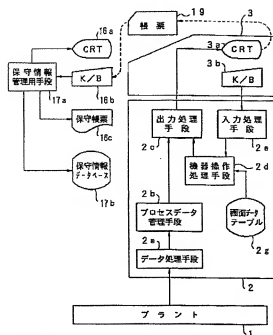
[Drawing 18]



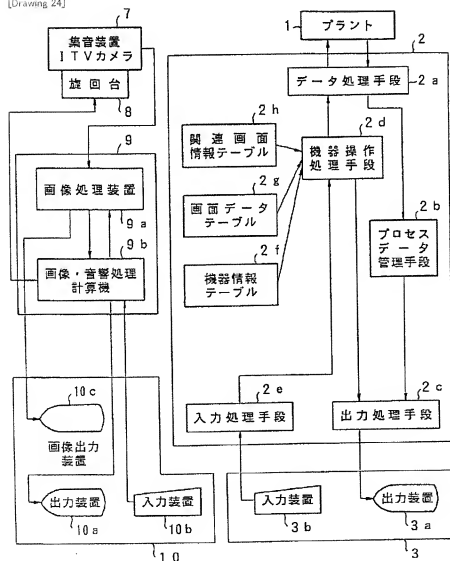
[Drawing 20]



[Drawing 22]



[Drawing 24]



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[Translation done.]



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## CLAIMS

## [Claim(s)]

[Claim 1] with a plant system screen, a group device actuation screen, a trend screen, and the screen data table that consists of a fixed indicative data of each device actuation window, and an adjustable indicative data The device information data table with which the device actuation window number about each actuation device and the tag or \*\*\*\*\* table number were registered for said every plant system screen, The related screen information table on which the screen number of the group device actuation screen related about each actuation device for said every plant system screen and a DORENDO screen is registered, The indicative data of this plant system screen by searching said screen data table, when the operating staff is demanding the display demand of a plant system screen Drawing, The screen data of the device actuation window of the actuation device chosen by the operating staff when the operating staff was demanding device selection The incidental information on said actuation device by searching said device information table, while taking out by searching said device information table and a screen data table Drawing, The related screen of said actuation device by searching said related screen information table and a screen data table Furthermore, drawing, A device actuation processing means to output a cutback demand when opting for and giving a panel division indication of whether such taken-out screen information is indicated by the icon according to a display, or it indicates by panel division, A screen cutback processing means to reduce the screen information taken out by said device actuation processing means based on said cutback demand, In an icon display, the screen information taken out by said device actuation processing means is displayed on said display as it is. In a panel division display Plant supervisory equipment characterized by having a display-control means to display on said display the screen information reduced by said screen cutback processing means.

[Claim 2] In the plant supervisory equipment which chooses and operates plant equipment while compounding the process data of a plant with the fixed screen information of a plant, displaying it on the screen of an output unit and supervising the condition of a plant An incidental information storing means by which the maintenance information management table which consists of maintenance information management data which manage said maintenance information, The device information table on which the index pointer for having the information for performing monitor and actuation of said device collectively, and referring to the maintenance information management data of said incidental information management means is stored, Based on the demand from an operating staff, said index pointer about said device with reference to said device information table Drawing, An incidental information setting-out means to perform setting-out registration and deletion of the maintenance information data which correspond with reference to said maintenance information management data based on this index pointer, In order to manage the maintenance information on said plant equipment, when said maintenance information data are updated by said incidental information setting-out means Plant supervisory equipment characterized by having the maintenance information management means which transmits the updating demand from said maintenance information management system, and updating data to said incidental information setting-out means while updating the maintenance information database in the maintenance information management system formed outside.

[Claim 3] In the plant supervisory equipment which chooses and operates plant equipment while compounding the process data of a plant with the fixed screen information of a plant, displaying it on the screen of an output unit and supervising the condition of a plant The content of display managed table which manages the content displayed on said output unit as an incidental information storing means by which incidental information is stored, The incidental information management means which consists of an actuation information table which manages actuation related information, and a language information management table which manages the natural language information set up if needed, The device information table on which the index pointer for having the information for performing monitor and actuation of said device collectively, and referring to each table of said incidental information management means is stored, Based on the demand from an operating staff, the index pointer about said device with reference to said device information table Drawing, Plant supervisory equipment characterized by having an incidental information setting-out means to perform the edit and setting out of incidental information which correspond with reference to the table of said incidental information management means based on this index pointer.

[Claim 4] In the plant supervisory equipment which detects abnormalities by processing the image which photos the situation of the site of a plant using two or more photography equipments, and is sent out from said photography equipment with an image-processing means An actuation means to move the swivel base into which the photography equipment which projects said object device operated among the photography equipment of a base by the advice of device actuation from a device actuation screen is chosen as, and the sense of the photography equipment is changed, [ two or more ] The positional information table which memorizes the positional information of said photography equipment, and the actuation means of communication which transmits the operator command of said photography equipment which projects the device which is an object for actuation using the positional information from this positional information table to said image-processing means, The device information table on which the information about said plant equipment is stored, and a display-control means to display information and data on a display, Plant supervisory equipment characterized by having an abnormality detection data-processing means to record generating of abnormalities on said device information table while notifying this detection result to said display-control means when abnormalities are detected by the image processing.

[Translation done.]

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## EXAMPLE

[Example] The configuration of one example of the plant supervisory equipment by the 1st this invention is shown in drawing 1. The plant supervisory equipment 2 of this example is equipped with data-processing means 2a, process-data management tool 2b, output-processing means 2c, 2d of device actuation processing means and input-process means 2e, device information table 2f, screen data table 2g, related screen information table 2h, and screen cutback processing means 2u.

[0034] Data-processing means 2a notifies device operator command to a plant 1 by the demand from 2d of device actuation processing means while it samples the process data of a plant 1 with a predetermined period and sends out this process data to process-data management tool 2b. Process-data management tool 2b sends out the process data from data-processing means 2a to output-processing means 2c, when there is a demand from output-processing means 2c. Output-processing means 2c performs screen-display processing of the process data sent out from process-data management tool 2b, and the various indicative data notified from 2d of device actuation processing means, and screen cutback processing means 2u, and displays it on output unit 3a in CRT I/O device 3.

[0035] While 2d of device actuation processing means gives the cutback demand of the screen data of the plant system screen displayed on output unit 3a to screen cutback processing means 2u. The indicative data of the plant system screen which the operating staff notified from input-process means 2e requires. The indicative data of the device actuation window of the device which an operating staff requires, the indicative data of a related screen (a group device actuation screen and trend screen), and the table number of incidental information (a tag or \*\*\*\*\*) are searched, and it notifies to output-processing means 2c.

[0036] An operating staff processes the various demands inputted through input unit 3b in CRT I/O device 3, and notifies input-process means 2e to 2d of device actuation processing means. The tag or \*\*\*\*\* table number is registered device information table 2f. A fixed indicative data and adjustable indicative data, such as a plant system screen, a group device actuation screen, a trend screen, and a device actuation window, are stored screen data table 2g. The group device actuation screen number and the trend screen number are registered related screen information table 2h as a related screen of the device for actuation contained all over a plant system screen.

[0037] Next, actuation of the 1st example is explained with reference to drawing 2. In addition, drawing 2 is a flow chart which shows the procedure of 2d of device actuation processing means. First, the display demand of the plant system screen for performing device actuation to plant supervisory equipment 2 is sent to input-process means 2e by the operating staff through input unit 3b. The plant system screen number is contained in this display demand, and this plant system screen number is notified to 2d of device actuation processing means by input-process means 2e (step F1 reference). Then, 2d of device actuation processing means searches screen data table 2g based on the plant system screen number notified from input-process means 2e, and they take out the fixed indicative data and adjustable indicative data which are registered as corresponding screen data, and notify them to output-processing means 2c (step F2, F14 reference). Output-processing means 2c displays the fixed indicative data notified from 2d of device actuation processing means on output unit 3a, and displays the process data which corresponds from process-data management tool 2b based on an adjustable indicative data further on drawing output unit 3a. Thus, a plant system screen is displayed on output unit 3a.

[0038] If a series of processings are completed and 2d of device actuation processing means reaches step F15, they will stand by the input again sent to initiation (step F0) of the flow chart shown in drawing 2 from return and input-process means 2e.

[0039] If the device which an operating staff should operate through input unit 3b from on the plant system screen currently displayed on output unit 3a is chosen, input-process means 2e will notify X-Y coordinate of the device which the operating staff chose to 2d of device actuation processing means (step F1, F3 reference). And if output unit 3a is small CRT in step F7, as it progresses to steps F8, F9, and F14 and is shown in drawing 3 (b), expansion of a device actuation window will be performed, and advice will be made by output-processing means 2c so that an icon may be displayed on a plant system screen.

[0040] On the other hand, if output unit 3a is large-sized CRT in step F7, it will progress to step F10. 2d of device actuation processing means X-Y coordinate notified from input-process means 2e collates with the fixed indicative data of the plant system screen searched from screen data table 2g. Determine the equipment item number of the actuation device which the operating staff chose, and device information table 2f is searched based on this equipment item number and a plant system screen number. The device actuation window number and tag or \*\*\*\*\* table number corresponding to the device chosen on the plant system screen currently displayed on output unit 3a are taken out. Then, it progresses to step F11, and 2d of device actuation processing means searches related screen information table 2h based on a plant system screen number and an equipment item number, and they take out the group device actuation number and trend screen number which are registered. And it progresses to step F12, a screen data table is searched based on a group device actuation screen number, a trend screen number, and a device actuation window number, and a fixed indicative data and an adjustable indicative data are taken out.

[0041] Then, while 2d of device actuation processing means notifies a plant system screen number to screen cutback processing means 2u, the cutback demand of a screen is performed (step F13 reference). Then, after screen cutback processing means 2u searches screen data table 2g based on a plant system screen number, it performs drawing and cutback processing and notifies screen data to output-processing means 2c through 2d of device actuation processing means (step F14 reference). Output-processing means 2c is displayed on output unit 3a by making into an indicative data the screen data by which cutback processing was carried out. Since output unit 3a is large-sized CRT at this time as mentioned above, as shown in drawing 4, a panel division indication of the screen data is given. That is, a plant system screen, a group device actuation screen, a trend screen, a device actuation window and a tag, or \*\*\*\*\* is displayed on each display area of output unit 3a.

[0042] In addition, if the input sent out from input-process means 2e is not the information about device selection in the device selection step F3 shown in drawing 2, it will progress to step F4. It is distinguished whether input is an icon actuation demand, and processing will be ended if it is not an icon actuation demand. When it is an icon actuation demand, it progresses to step F5. Device information table 2f. A closing motion demand of drawing and icon information is notified for required information to output-processing means 2c from screen data table 2g and related screen information table 2h (refer to the drawing 2 steps F6 and F14 and drawing 3 (a)). In addition, as the equipment item number, the device actuation window number, the incidental information table pointer, etc. are respectively recorded on device information table 2f for every plant system screen as shown in drawing 5, and shown in screen data table 2g at drawing 6 For every plant

system screen, a plant system screen, a group device actuation screen, The fixed indicative data and adjustable indicative data of a trend screen and device actuation are recorded, it gets down, and the equipment item number, the group device actuation screen, the trend screen, etc. are recorded on related screen information table 2h for every plant system screen.

[0043] As explained above, according to this example, the actuation device selection demand of an operating staff, The reduced display of the plant system screen display currently displayed on the screen of output unit 3a is carried out. To the screen-display opening area of output unit 3a, a related information screen and the incidental information are indicated by automatic. By switching and carrying out whether these functions are considered as an icon display with the display engine performance of output unit 3a by having the function to operate plant equipment, referring to related information, or it considers as a panel display division Hard to see [ of the display given to an operating staff ] by lowering of the screen-display resolution of an output unit at the time of a screen cutback While becoming possible about plant equipment actuation in the condition of having stopped, when actuation device selection is performed again Can also perform not only a device actuation window but the display of the incidental information about the selected device, and a related screen within the same function, the amount of information with which an operating staff is provided is made to increase, and the actuation number of steps for a related screen or an incidental information display can be reduced.

[0044] Next, the configuration of the 1st example of the plant supervisory equipment by the 2nd invention is shown in drawing 8 . The plant supervisory equipment 2 of this example newly prepares device information table 2f, 2l of attached information setting-out means, 2m of attached information management means, 2n of attached information storing means, maintenance information data radial transfer means 2w, and maintenance information management means 2x in the conventional plant supervisory equipment 2 shown in drawing 22 . In addition, maintenance information management TEFURU 2y is contained in 2m of attached information management means, and maintenance information data 2o is contained in 2n of attached information storing means. Moreover, maintenance information data radial transfer means 17c and 17d of maintenance information data-base-updating means are newly formed in the maintenance information management system 17 under management of a remedy operation exclusive duty person.

[0045] In this example, all are managed by 2m of incidental information management means about the information concerning plant equipment. Device information table 2f, it has as data the pointer which refers to maintenance information management table 2y about all the information that is needed for a monitor and actuation of the device concerned. The index pointer in which the storing location of the maintenance information on the device concerned is shown also about maintenance information data 2o in 2n of incidental information storing means is stored in maintenance information management table 2y for every device.

[0046] In addition, with reference to the index pointer stored in device information table 2f, it carries out also with the case where maintenance information data 2o currently recorded on 2n of incidental information storing means by 2l of incidental information setting-out means is edited or registered also about the case where maintenance information data 2o currently recorded on 2n of incidental information storing means by maintenance information management means 2x is referred to.

[0047] Maintenance information management table 2y which constitutes 2m of incidental information management means has the pointer in which the reference part of maintenance information data 2o within 2n of incidental information storing means is shown, and its data length for every device. That is, the content of actual maintenance information itself is referred to from maintenance information management table 2y and 2n of incidental information storing means.

[0048] Drawing 9 shows the relation of these table formats, and drawing 10 is a flow chart which shows the process in the case of referring to 2o for the maintenance information data currently recorded on 2n of incidental information storing means by maintenance information management means 2x.

[0049] For example, in plant supervisory equipment 2, in order to refer to maintenance information, from the location of the memory of 2n of incidental information storing means, the information relevant to maintenance of a device is passed to output-processing means 2e with reference to the maintenance information data of this device with reference to the location shown by maintenance information management table 2y, and this is displayed on output unit (CRT) 3a of I/O device 3.

[0050] In this case, a demand is first made from maintenance information management means 2x by 2d of device actuation processing means (step F21 reference of drawing 10 ), and device information table 2f is referred by 2d of this device actuation processing means (step F22 reference). After acquiring the pointer 4 for incidental information management shown in drawing 9 here and acquiring the start address of maintenance information management table 2y made into the object (step F23 reference), the address which carried out the index according to the pointer is referred to. By this, the data length of the address which is 2n of incidental information storing means by which the actuation information on the device made into the object is recorded, and actuation information is acquired, and maintenance information data 2o is acquired with reference to (Step F24 reference) and this part (step F25 reference). Maintenance information will be displayed based on this (step F26 reference).

[0051] About the case where the maintenance information currently recorded on 2n of incidental information storing means by the incidental information setting-out means 2l is edited or registered on the other hand, 2n of incidental information storing means is updated by updating the address and the data length which are recorded on maintenance information management table 2m of incidental information management means 2y in maintenance information management table 2y with a device information table 2f index.

[0052] The procedure at this time is shown in the flow chart of drawing 11 . For example, by maintenance information setting-out demand actuation from input unit 3b by the operating staff, if setting-out demand actuation is interpreted by input-process means 2e, the identification number (equipment item number) of this device and the data with which the content of a demand was included will be passed to the incidental information setting-out means 2l (step F31 reference). Next, based on an equipment item number, the pointer 4 for incidental information management is acquired from device information table 2f (step F32 reference), and the maintenance information data of the applicable device of maintenance information management table 2y are acquired with reference to the start address of maintenance information management table 2y which manages the location which stores the maintenance information taken out from this and a write request (step F33 reference). That is, if the empty area corresponding to this can be secured to 2n of memory areas, i.e., an incidental information storing means, with reference to the data length of new maintenance information data, the start address and data length are updated as data of maintenance information management table 2y (steps F34 and F35), and maintenance information data are further updated in the sourced area here (step F36 reference). An error is returned if not securable (step F37 reference).

[0053] Like [ when deleting data ] the case of setting out of the incidental information table 2f is referred to. The device starting address concerned by which the deletion demand was carried out from device information table 2f is referred to. The device starting address concerned in maintenance information management table 2y, and a data length Maintenance information data 2o should be beforehand deleted within the program which scans 2n of incidental information storing means by rewriting the above-mentioned starting address and the above-mentioned data length to the numeric value prescribed that it is judged that he has no incidental information (indeterminate).

[0054] On the other hand, since maintenance information database 17b in the maintenance information management system 17 contains the management information except being needed for plant supervisory equipment, it is not set in plant supervisory equipment 2. It shall have separately the system 17 for maintenance information management under management of a remedy operation exclusive duty person, and shall be managed in this. Therefore, in order to make it not cause the mismatching between plant supervisory equipment 2 and the system 17 for maintenance information management, when modification arises in which side, it has the structure which updates each other data automatically. This is performed by maintenance information management means 2x or maintenance information management manual stage

17a. As shown in *drawing 12*, when it judges that modification arose (step F41 reference), maintenance information management means 2x or maintenance information management manual stage 17a. This is notified to *drawing (step F42 reference)* and maintenance information data radial transfer means 2w or 17c (step F43 reference), and maintenance information is transmitted to another side through a maintenance information data means of communication 18 with reference to each maintenance information data, respectively (step F44 reference).

[0055] If this is received by the system 17 side for maintenance information management, the updating demand to 17d of maintenance information data radial transfer will be performed by 17d of maintenance information data-base-updating means.

[0056] Moreover, in the plant supervisory equipment 2 side, if an updating demand of maintenance information is received, this will be notified to the incidental information setting-out means 21, and this will update maintenance information data 2o (steps F46 and F47, F48 reference).

[0057] As explained above, according to this example, conventionally with a plant log sheet, an activity communication table, etc. With reference to the maintenance information database of the maintenance information management system 17 independently created and managed as remedy operation in plant supervisory equipment 2, by having enabled it to manage. It enables an operating staff to refer to easily the device maintenance information which is needed in case device actuation is performed. It notifies or displays on an operating staff that there is furthermore this maintenance information through an output unit. Moreover, accept the need, setting-out-register, or delete maintenance information, and the operation which was being conventionally performed with the document for maintenance communication etc. is created on-line. By the ability registering, by carrying out package management of the device information, the troublesomeness accompanying the duplex management on employment of device related circumstance information is lost, and these devices related circumstance information can be easily referred to including device related circumstance information and maintenance information.

[0058] Next, the configuration of the 2nd example of the plant supervisory equipment by the 2nd invention is shown in *drawing 13*. The plant supervisory equipment 2 of this example newly establishes device information table 2f, 2l of incidental information setting-out means and an incidental information management means, and 2n of incidental information storing means in the conventional plant supervisory equipment shown in *drawing 23*. And foreground-color table 2g and display configuration managed table 2j, actuation information table 2j, and graphic-character managed table 2p are contained in 2m of incidental information management means.

[0059] In this example, all are managed by device information table 2f about the information concerning plant equipment. Although it has as data the pointer which refers to the information table device information table 2f about all the information that is needed for a monitor and actuation of the device concerned, also about 2m also of incidental information management means Graphic-character managed table 2p which constitutes this, foreground-color table 2g. It has in common with all of display configuration managed table 2j, actuation information table 2j, and language information management table 2k, and the index pointer in which the storing location of the administrative information on the device concerned which can be shown is stored for every device.

[0060] With reference to the index pointer stored in device information table 2f, it carries out also with the case where the incidental information currently recorded on 2n of incidental information storing means by the incidental information setting-out means 21 is edited or registered also about the case where the incidental information currently recorded on 2n of incidental information storing means by 2d of device actuation processing means is referred to.

[0061] The content of the alphabetic character which displays each of graphic-character managed table 2p which constitutes 2m of incidental information management means, foreground-color table 2g, display configuration managed table 2j, actuation information table 2j, and language information management table 2k as incidental information. It has the pointer in which the reference part of 2n of incidental information storing means to store the language information as the color of a graphic and a configuration, the information relevant to actuation of a device, and circumstance information is shown, and its data length for every device. That is, the content of actual incidental information itself is referred from 2n of incidental information storing means by the pointer and data length of each table of graphic-character managed table 2p, foreground-color table 2g, display configuration managed table 2j, actuation information table 2j, and language information management table 2k. The relation of these table formats is shown in *drawing 14*.

[0062] About the case where the incidental information currently recorded on 2n of incidental information storing means by 2d of device actuation processing means is referred to, the process is shown in the flow chart of *drawing 15*. For example, in order to use to forbid actuation of this device by the tag credit function to the device actuation window which is one function of plant supervisory equipment, i.e., failure of a device etc., temporarily By the function which displays the tag which specifies this purpose on a device actuation window, in order to realize actuation to the device concerned From the location of the memory currently prepared as 2n of incidental information storing means The data of tag are referred to [whether actuation is forbidden to this device with reference to the location shown by actuation information table 2j in the information relevant to actuation of this device, and ]. It must judge whether the actuation from CRT I/O device 3 of the operating staff to the device concerned is received.

[0063] In this case, device information table 2f is first referred by 2d of device actuation processing means (step F51 reference). After acquiring the pointer 4 for incidental information management shown in *drawing 14* here and acquiring the start address of actuation information table 2j made into the object (step F52 reference), the address which carried out the index according to the pointer for incidental information management is referred to. By this, the data length of the address which is 2n of incidental information storing means by which the actuation information on the device made into the object is recorded, and actuation information is acquired (step F53 reference), and incidental information data are acquired with reference to this part (step F54 reference). It will be judged based on this whether device actuation is possible (step F55 reference).

[0064] In addition, in the function in which an operating staff can set the content of the graphic character of the tag at the time of the arbitration setting up function of a graphic character used by a tag credit function etc., i.e., a tag, having started as arbitration etc., the location in which data, such as a graphic character, are stored with reference to graphic-character managed table 2p from device information table 2f can be accessed similarly.

[0065] About the case where the incidental information currently recorded on 2n of incidental information storing means by the incidental information setting-out means 21 is edited or registered on the other hand Graphic-character managed table 2p which constitutes 2m of incidental information management means with a device information table 2f index, Foreground-color table 2g, display configuration managed table 2j, actuation information table 2j, and language information management table 2k is accessed. And based on the data of the content of modification The data length of the item into which it changes is newly updated to each of graphic-character managed table 2p, foreground-color table 2g, display configuration managed table 2j, actuation information table 2j, and language information management table 2k, and 2n of incidental information storing means is updated. The procedure at this time is shown in the flow chart of *drawing 16*.

[0066] For example, when the function in which tag credit is recorded for every device in case a note of fixed number of letters is made instead of the memorandum function in said tag credit function, i.e., the conventional communication note etc., and it can set is realized, By memorandum setting-out demand actuation from input unit 3b by the operating staff, if memorandum setting-out demand actuation is interpreted by input-process means 2e The identification number of this device, and the content of a demand and the data with which memorandum sentence data and the write request of a memorandum sentence were contained in this case are passed to 2l of incidental information setting-out means (step F61 reference). Next, by the equipment item number, the pointer 4 for incidental information

management is acquired from device information table 2f (step F62 reference), and the management information data of the applicable device of language information management table 2k are acquired with reference to the start address of language information management table 2k which manages the location which stores the memorandum sentence taken out from the write request of this and a memorandum sentence (step F63 reference). That is, if the empty area corresponding to this can be secured to 2n of memory areas, i.e., an incidental information storing means, with reference to the data length of a new memorandum sentence, the start address and data length are updated as data of language information management table 2k (step F64, F65 reference), and the data of a memorandum sentence are further updated in the secured area here (step F66 reference). An error is returned if reservation is impossible (step F67).

[0067] Thus, the variable-length data in other, for example, the configuration of a display tag etc., enables updating and edit, moreover, in deleting the incidental information set as each device. The index of the device by which the deletion demand was carried out from device information table 2f is referred to like the setting-out approach of the incidental information mentioned above. The device starting address concerned in graphic-character managed table 2p, and a data length. The incidental information on a device should be beforehand deleted within the program which scans 2n of incidental information storing means by rewriting a starting address and a data length to the numeric value prescribed that it is judged that he has no incidental information (indeterminate).

[0068] It treats as incidental information by this example, and what is mentioned in 2n of incidental information storing means is raised to drawing 17, and the table format within 2n of incidental information storing means is mentioned to it.

[0069] The incidental information management means which consists of a language information management table which manages the natural language information on others which are set up if needed according to this example as explained above. An incidental information storing means to store the data of these incidental information actually. An operating staff setting-out registration and deletion of said incidental information from plant supervisory equipment. The incidental information setting-out means which makes it possible to edit said incidental information management means \*\*\*\* incidental information storing means in case it carries out to arbitration is added. Conventionally with a plant log sheet, an activity communication table, etc. An operating staff can be enabled to recognize or refer to easily the device related circumstance information which is needed in case device actuation is performed by carrying out unitary management of the incidental information (device related circumstance information) which the operating staff had created and managed and which shows a device condition.

[0070] The troublesomeness accompanying the duplex management on employment of device related circumstance information is lost by carrying out package management of the device information including device related circumstance information and maintenance information, and these device related circumstance information can refer to easily by notifying or displaying on an operating staff that there is furthermore this incidental information through an output unit, and accepting the need, setting-out-registering or deleting incidental information.

[0071] Next, the configuration of one example of the plant supervisory equipment by the 3rd invention is shown in drawing 18. The plant supervisory equipment 2 of this example newly prepares camera actuation judging means 2r, camera positional information table 2s, and 2t of camera actuation means of communication and abnormality detection data-processing means 2v in the conventional plant supervisory equipment shown in drawing 24.

[0072] In this example, camera positional information table 2s for memorizing the positional information of the ITV camera 7 with sound-collecting equipment for the monitor of the device of a site with the monitor of a plant and actuation is prepared, and the positional information over the device which each ITV camera 7 with sound-collecting equipment installed two or more sets supervises is memorized. An operator demands device selection in a system screen, and device actuation from a device actuation screen from input unit 3b of CRT I/O device 3, and notifies processing of screen processed data and the information on the device operated to input-process means 2e. From input-process means 2e, screen modification and device actuation are notified to 2d of device actuation processing means, and it processes with reference to each information (device information table 2f, screen data table 2g, and related screen information table 2h).

[0073] And the data of the processed device rewrite information, such as device information table 2f and screen data table 2g. With reference to device information table 2f and camera positional information table 2s, judgment of a camera and sorting processing of positional information are performed in camera actuation judging means 2r for advice of the judgment of a camera to a monitor device, or actuation. This camera distinction processing and the sorting result of positional information are notified to 2t of camera actuation means of communication. And a demand is sent to the image and acoustical-treatment computer 9b of the abnormality detection system 9 from 2t of this camera actuation means of communication. In an image and acoustical-treatment computer 9b, processing changed to the ITV camera 7 with sound-collecting equipment corresponding to an actuation device and demand processing for operating a swivel base 8 are performed, and an operational request is performed to a swivel base 8.

[0074] The image from the ITV camera 7 with sound-collecting equipment for an actuation device is sent to image processing system 9a in the abnormality detection system 9, and after processing is made, processing for abnormality detection is performed with the vibrating reed from sound-collecting equipment in an image and acoustical-treatment computer 9b. A monitor image and a processing image are sent to output-processing means 2c through abnormality detection data-processing means 2v. In abnormality detection data-processing means 2v, the detection result of the actuation device concerned is returned to device information table 2f. Moreover, an image data etc. is passed to output-processing means 2c as it is. In addition, the data from process-data management tool 2b which saves the screen data processed by 2d of device actuation processing means, the information on device actuation, and the process value which came out from the plant 1 are sent to output-processing means 2c, and it displays on it to output unit 3a of CRT I/O device 3.

[0075] Each function of the abnormality detection system 9 can be operated from input unit 3b of CRT I/O device 3. An actuation screen and the display with which the on-site image of the actuation device was outputted are shown in drawing 19. In drawing 19, in 11, a device actuation window and 13 show an ITV camera image screen, and, as for a CRT display screen and 12, 14 shows the abnormality detection system display screen.

[0076] According to the above example, by this invention, it becomes possible to display the image of a monitor and an actuation device on CRT I/O device 3 of plant supervisory equipment 2 with a device actuation window and a plant system screen, the ITV camera 7 with sound-collecting equipment which projects the actuation device by the device actuation demand from input unit 3b can be changed, and the monitor image can be outputted now to output unit 3a.

[0077] As explained above, according to this example, the result of detection by abnormality detection equipment can be easily referred to on the plant control monitor board, and both displays can be supervised simultaneously. Moreover, since it is operated with the same control panel also on actuation, mutually, trouble can be carried out also to the readiness of actuation so that there may be nothing, the operability of operation and a monitor and visibility can be raised, and an operation burden can be reduced.

[0078]

[Translation done.]

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2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

## MEANS

[Means for Solving the Problem] the plant supervisory equipment by the 1st invention with a plant system screen, a group device actuation screen, a trend screen, and the screen data table that consists of a fixed indicative data of each device actuation window, and an adjustable indicative data The device information data table with which the device actuation window number about each actuation device and the tag or \*\*\*\*\* table number were registered for said every plant system screen, The related screen information table on which the screen number of the group device actuation screen related about each actuation device for said every plant system screen and a DORENDO screen is registered, The indicative data of this plant system screen by searching said screen data table, when the operating staff is demanding the display demand of a plant system screen Drawing, The screen data of the device actuation window of the actuation device chosen by the operating staff when the operating staff was demanding device selection The incidental information on said actuation device by searching said device information table, while taking out by searching said device information table and a screen data table Furthermore, Drawing, A device actuation processing means to output a cutback demand when opting for and giving a panel division indication of whether such taken-out screen information is indicated by the icon according to a display, or it indicates by panel division, A screen cutback processing means to reduce the screen information taken out by said device actuation processing means based on said cutback demand, In an icon display, the screen information taken out by said device actuation processing means is displayed on said display as it is. In a panel division display Plant supervisory equipment characterized by having a display-control means to display on said display the screen information reduced by said screen cutback processing means.

[0023] Moreover, the 1st mode of the plant supervisory equipment by the 2nd invention In the plant supervisory equipment which chooses and operates plant equipment while compounding the process data of a plant with the fixed screen information of a plant, displaying it on the screen of an output unit and supervising the condition of a plant An incidental information storing means by which the maintenance information data of said plant equipment are stored, An incidental information management means to have the maintenance information management table which consists of maintenance information management data which manage said maintenance information, The device information table on which the index pointer for having the information for performing monitor and actuation of said device collectively, and referring to the maintenance information management data of said incidental information management means is stored, Based on the demand from an operating staff, said index pointer about said device with reference to said device information table Drawing, An incidental information setting-out means to perform setting-out registration and deletion of the maintenance information data which correspond with reference to said maintenance information management data based on this index pointer, In order to manage the maintenance information on said plant equipment, when said maintenance information data are updated by said incidental information management system formed outside, it is characterized by having the maintenance information management means which transmits the updating demand from said maintenance information management system, and updating data to said incidental information setting-out means.

[0024] Moreover, the 2nd mode of the plant supervisory equipment by the 2nd invention In the plant supervisory equipment which chooses and operates plant equipment while compounding the process data of a plant with the fixed screen information of a plant, displaying it on the screen of an output unit and supervising the condition of a plant The content of display managed table which manages the content displayed on said output unit as an incidental information storing means by which incidental information is stored, The incidental information management means which consists of an actuation information table which manages actuation related information, and a language information management table which manages the natural language information set up if needed, The device information table on which the index pointer for having the information for performing monitor and actuation of said said device collectively, and referring to each table of said incidental information management means is stored, Based on the demand from an operating staff, the index pointer about said device with reference to said device information table Drawing, Plant supervisory equipment characterized by having an incidental information setting-out means to perform the edit and setting out of incidental information which correspond with reference to the table of said incidental information management means based on this index pointer.

[0025] Moreover, the plant supervisory equipment by the 3rd invention photos the situation of the site of a plant using two or more photography equipments. In the plant supervisory equipment which detects abnormalities by processing the image sent out from said photography equipment with an image-processing means An actuation means to move the swivel base into which the photography equipment which projects said object device operated among the photography equipment of a base by the advice of device actuation from a device actuation screen is chosen as, and the sense of this photography equipment is changed, [two or more] The positional information table which memorizes the positional information of said photography equipment, and the actuation means of communication which transmits the operator command of said photography equipment which projects the device which is an object for actuation using the positional information from this positional information table to said image-processing means, The device information table on which the information about said plant equipment is stored, and a display-control means to display information and data on a display, When abnormalities are detected by the image processing, while notifying this detection result to said display-control means, it is characterized by having an abnormality detection data-processing means to record generating of abnormalities on said device information table.

[Translation done.]

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- 3.In the drawings, any words are not translated.

## OPERATION

[Function] In case device actuation is performed from a plant system screen according to the plant supervisory equipment by the 1st invention constituted as mentioned above If the device set as the object of actuation is chosen, the group actuation screen number and trend screen number to which a device actuation processing means relates will be searched from a related screen information table. Search the device actuation window number and tag or \*\*\*\*\* table number of the device for actuation from a device information table, and a group device actuation screen, a trend screen, and the screen data of a device actuation window are made into an indicative data. Since it notifies to a display-control means with a tag or \*\*\*\*\* (incidental information) and a display-control means displays simultaneously a device actuation window, a group device actuation screen, a trend screen, a tag, or \*\*\*\*\* on a display Without changing a function, a group actuation screen and a trend screen can be referred as a related screen, and refer to a tag, \*\*\*\*\*, and the maintenance information for an operating staff as incidental information.

[0027] According to the 1st mode of the plant supervisory equipment of the 2nd invention constituted as mentioned above, moreover, on a device information table The incidental information management means which an operating staff operates using commercial-plant supervisory equipment in a plant and which has a maintenance information management cable as incidental information for every device. When it has the information for searching in order an incidental information storing means to store maintenance information for every device in these bases and a maintenance information management means refers to said incidental information management means and said incidental information storing means According to this, the information relevant to maintenance of the device concerned can be displayed outside.

[0028] Furthermore, based on the demand of an operating staff, it becomes possible to resemble an incidental information setting-out means and an incidental information management means, and to change the content of the incidental information storing means more, and when an operating staff is arbitration, the maintenance information on a device can be set up and edited. Moreover, this can be transmitted to a maintenance information management system through a maintenance information management means, and maintenance information data can be updated now. Thereby, conventionally, when that by which many were managed with means other than plant supervisory equipment through acquisition can manage unitary in a maintenance information database from the former with plant supervisory equipment, mainly while a document etc. prevents the mistake by duplex management, the device related circumference information concerning maintenance loses troublesomeness, and the improvement in effectiveness of operation of it is attained.

[0029] According to the 2nd mode of the plant supervisory equipment of the 2nd invention constituted as mentioned above, moreover, on a device information table For every device which an operating staff operates using commercial-plant supervisory equipment in a plant The content of display managed table which manages the content displayed on an output unit, the actuation information table which manages the information relevant to actuation of a device, And the incidental information management means which consists of a language information management table which manages the natural language information on others which are set up if needed, Whenever it has the information for searching in order an incidental information storing means to store information for every device in these bases and actuation of a device is performed, when a device actuation processing means refers to an incidental information management means and said incidental information storing means According to this, perform prohibition of actuation of the device concerned based on the information relevant to actuation of the device concerned, or Moreover, it can be managed by the incidental information management means, the incidental information currently recorded on the incidental information storing means can be outputted outside, and it can output to a display by making the content of incidental information into a graphic.

[0030] Furthermore, the incidental information on a device can be set up and edited by resembling an incidental information setting-out means and an incidental information management means, and changing the content of the incidental information storing means more based on the demand of an operating staff. Conventionally the device related circumference information concerning device actuation Pasting of a communication note or a document, tag credit, for example, a paper ticket, and an adhesion seal and the incidental information for which many were managed by means other than plant supervisory equipment through a help — wait and a needle etc. shows — mainly with plant supervisory equipment While preventing the mistake by duplex management by managing unitary, troublesomeness is lost and the improvement in effectiveness of operation operation is attained.

[0031] Moreover, according to the plant supervisory equipment of the 3rd invention constituted as mentioned above When device actuation is performed, the photography equipment for [ of the photography equipment currently installed two or more sets using the device manipulate signal ] actuation is judged. Move a swivel base and by outputting the projected image to the same display with a device actuation window and a plant system screen so that the judged photography equipment may move an object device While visibility improves in plant monitor operation, also in operation of a plant, a check of operation can be simultaneously performed at the time of actuation of a device.

[0032] Moreover, by having the result of the abnormality detection by the image processing in a device information table, this detects abnormalities and it also becomes possible to switch and display an actuation screen on a case.

[Translation done.]

## \* NOTICES \*

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

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TECHNICAL FIELD

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[Industrial Application] This invention relates to the plant supervisory equipment which supervises and operates the condition of a plant and carries out operation control of the plant.

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[Translation done.]



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## TECHNICAL PROBLEM

[Description of the Prior Art] Generally plant supervisory equipment chooses and operates plant equipment by compounding the various amounts of processes sent out from a plant with fixed screen information, such as a plant system screen beforehand memorized in plant supervisory equipment, a group device actuation screen, and a trend screen, and displaying them on a screen, supervising a plant condition.

[0003] The process data which a plant system screen classifies a plant according to each system, graphic-screen-izes it, and is actually measured on the plant here. The equipment currently installed is displayed on a graphic screen and it is used for carrying out the package monitor of the operation situation of a plant according to each system. And a group device actuation screen Carry out grouping of the device actuation window beforehand according to an interference system process each system exception, and it is registered. Two or more device actuation windows are displayed on a screen, and a part of a maximum of 8 devices can be simultaneous-supervised, for example, it can be operated. A trend screen The measured process data is indicated by linearity at the order of time series on the X-Y diagram which made the X-axis time amount and made the Y-axis data range width of face for every measurement point, and it enables it to supervise change by time amount progress of each process data.

[0004] In addition, by processing according the plant equipment actuation which was being conventionally performed with the hard switch to software, a device actuation window summarizes a device actuation switch and a process data, device operational status, etc. for every device, displays them on the monitor screen of plant supervisory equipment, and enables device actuation from plant supervisory equipment.

[0005] The configuration of the 1st example of conventional plant supervisory equipment is shown in drawing 20. In drawing 20, from a plant 1, data-processing means 2a samples the various amounts of processes periodically, and notifies them to process-data management tool 2b. Moreover, the demand from 2d of device actuation processing means notifies device operator command to a plant 1.

[0006] 2d of device actuation processing means judges what the demand of an operating staff is based on the data sent out from input-process means 2e, and they perform the display demand of a screen to output-processing means 2c at the same time it reads screen data in the screen-display demand of the above-mentioned plant system screen, a group device actuation screen, a trend screen, etc., and a plant equipment selection demand and they notify it to output-processing means 2c from screen data-table 2g. Moreover, in a plant equipment actuation demand, the demand of an operating staff performs the actuation output request to data-processing means 2e.

[0007] Output-processing means 2c performs a screen display to output unit 3a by the above-mentioned screen data and process-data management tool 2b as said plant system screen on display with reference to the process data of the actuation device concerned.

[0008] The example of a screen at the time of plant equipment actuation is shown in drawing 21. Although it was operated by the device actuation window 211 which is displayed and which chose plant equipment from the plant system screens 210, and was displayed on the screen when plant equipment was operated so that drawing 21 might show, at this time, the operating staff displayed the related information screen of the above-mentioned device for actuation by screen separation on the same CRT, and it was operating it, supervising related information. Moreover, in order to have checked the above-mentioned related information screen, it had to check by sorting out and requiring the information which an operating staff needs by the screen-display demand according to individual, respectively, retrieval and a display of a related information screen took time amount, and it had become the burden of an operating staff.

[0009] Moreover, the 2nd example of conventional plant supervisory equipment is explained with reference to drawing 22.

[0010] Conventionally, the information relevant to maintenance of a device was managed considering the document 19 as the base by the full-time person who mainly hits remedy operation. That is, the abnormalities of the device discovered by plant supervisory equipment 2 are registered into maintenance information database 17b by the full-time remedy operation pursuer through input-device 16b and maintenance information management means 17a, and are further recorded on maintenance document 16c while they are recorded on a document 19. Therefore, in the operating staff actually engaged in operation of a plant, it always needed to check with the document base that transfer of such maintenance related information was performed proper. Moreover, these maintenance related information could not be referred to in plant supervisory equipment 2, but since the abnormalities of the device discovered within plant supervisory equipment 2 were not able to be immediately reflected in maintenance information, the operating staff needed to fill in the document uniquely and needed to transmit to the remedy operation pursuer.

[0011] Moreover, the 3rd example of conventional plant supervisory equipment is explained with reference to drawing 23.

[0012] Conventionally, as for the device related circumstance information concerning device actuation, many are mainly managed by means other than plant supervisory equipment 2 through the help — pasting of a communication note or a document, tag credit, for example, a paper ticket, and an adhesion seal and wait and a needle etc. shows. It restricted, when prohibition of device actuation was performed as an exception, and device actuation prohibition information was combined with 2d of device actuation processing means and its both, and was managed. In this case, if an operating staff operates prohibition of device actuation from I/O device 3, according to actuation of the operating staff interpreted by input-process means 2e, it will display that 2d of device actuation processing means has the device concerned in the condition against actuation by rewriting of screen data table 2g on output unit 3a through output-processing means 2c. With other screen information, this screen display is combined with screen data table 2g, and is managed. Furthermore, any actuation to the device concerned by which actuation prohibition assignment of the 2d of the device actuation processing means is carried out is made not to be outputted to a plant 1 through data-processing means 2a.

[0013] In such plant supervisory equipment 2, the information which can treat an operating staff by the actuation which used I/O device 3 was only information which specifies prohibition of above-mentioned device actuation of many. About related information other than this, an inspection with either periodical for example, of the devices of a plant 1 etc. sake, When it is working by stationing authorized personnel in a site and the device cannot be operated on insurance, an operating staff In response to the notification, this is indicated to the note for communication, or the white sheet, and it manages by human being's hand, and said actuation prohibition information is set up using I/O device 3 of plant supervisory equipment 2. However, information, such as other related information, for example, the termination schedule

time of day of this activity etc., was managing even in this case by recording with record means other than plant supervisory equipment 2, such as the above-mentioned note for communication, or a white sheet.

[0014] Moreover, the 4th example of conventional plant supervisory equipment is explained with reference to drawing 24. Generally, an ITV camera with sound-collecting equipment and a microphone are used for condition monitoring of the plant supervisory equipment for performing operation of a plant, and condition monitoring in the monitor of a power generating plant, and control, and the major equipment of a plant, abnormalities are detected from an image and a sound, and the abnormality detection system which emits an alarm is installed in the central operation room. Those systems are shown in drawing 24. Two or more CRT I/O devices 3 are installed, according to each system of a boiler, a turbine, and a generator, it divides [2-3], and arranges in [each] a control panel, and CRT operation performs actuation starting of equipments, such as a pump and a valve, a halt, open, and close in plant supervisory equipment 2 instead of hard switches. The manipulate signal from input unit 3b goes into input-process means 2e in plant supervisory equipment 2. From this input-process means 2e, a screen-display demand and a device actuation demand are performed. In a screen-display demand, with reference to related screen information table 2h and screen data table 2g, it is processed by 2d of device actuation processing means, and a demand is given to output-processing means 2c. In a device actuation demand, with reference to device information table 2f, it is processed by 2d of device actuation processing means, and a demand is given to output-processing means 2c. Output-processing means 2c performs a screen output to output unit 3a.

[0015] Moreover, in order that the abnormality detection system 9 which is a kind of plant supervisory equipment 2 may supervise the major equipment of a site, sound-collecting equipment and the ITV camera 7 are used for it, and it performs processing of an image and sound. And the image of an ITV camera with sound-collecting equipment is outputted to image output unit 10c. Processing of an image has the processing judged based on change, difference, etc. of a color and an illuminance performed by image processing system 9a in the abnormality detection system 9. Both these processed data and sound data detect an abnormal condition by image and acoustical-treatment computer 9b, and output an alarm to output unit 10a in the abnormality detection system control panel 10. Moreover, the sound-collecting equipment and the ITV camera 7 which have more than one are chosen, or input unit 10b in the abnormality detection system control panel 10 performs the change of an accompanying function.

[0016] It can carry out by using plant supervisory equipment and operation of a plant and a monitor concentrating by one place by this, and since actuation also of device actuation is possible by touching CRT, it becomes possible to aim at improvement in operability. Moreover, in emergency supervisory equipment, the condition of a monitor device is known on that spot to an image and a sound, and an image and a sound are saved as record.

[0017] In a power generating plant, the device related circumference information which is needed in case device actuation is performed conventionally in order that it is not managed within plant supervisory equipment, or it is managed with another equipment, and an operating staff cannot refer to information easily but may manage these devices related circumference information by the help. While it was obliged to employment top duplex management and was accompanied by troublesomeness, possibility that a human error would start was conceived.

[0018] In the function in which were made in order that this invention might solve these problems, and the 1st object performs device actuation from a plant system screen. When actuation device selection is performed, by performing not only a device actuation window but the display of the incidental information about the selected device, and a related screen within the same function, the amount of information with which an operating staff is provided is made to increase, and it is in reducing the actuation number of steps for a related screen or an incidental information display.

[0019] The 2nd object of this invention is to lose the troublesomeness accompanying the duplex management on employment of device related circumference information, and enable it to refer to these devices related circumference information easily by carrying out package management of the device information with plant supervisory equipment including device related circumference information and maintenance information.

[0020] Furthermore, in conventional plant supervisory equipment, the plant control monitor board and abnormality detection equipment were another facilities, it was difficult for them to supervise both displays by turns, and the problem was in visibility. Moreover, in order to operate it with the control panel according to individual also on actuation, there is a problem also in the readiness of actuation.

[0021] The 3rd object of this invention can be performed so that there may not be operation and monitor operation mutually about trouble, it raises the operability of operation and a monitor, and visibility, and is to offer the plant supervisory equipment which can reduce an operation burden.

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[Translation done.]